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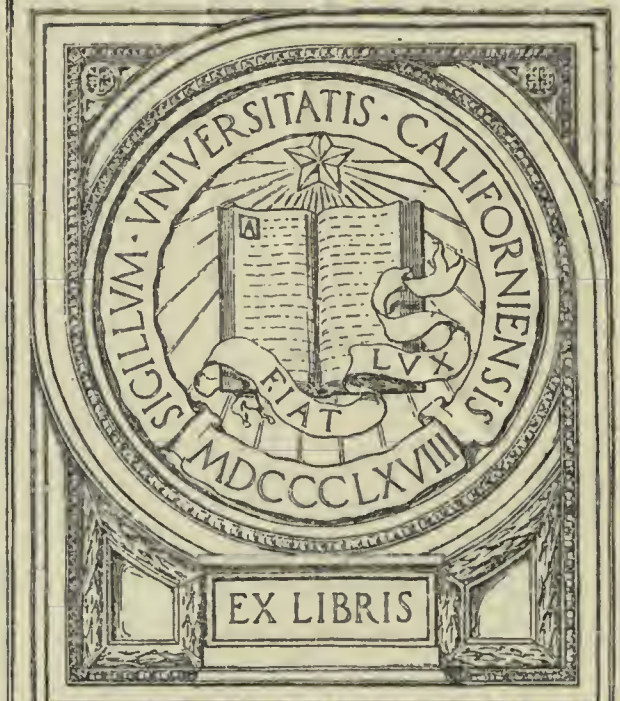

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UNIV. OF CALIFORNIA

THE UNIVERSITY OF CALIFORNIA.

BY

MILICENT W. SHINN.

Sheets from

"The Overland Monthly,"

For October, November and December, 1892.

Bacon & Company, Printers, San Francisco.

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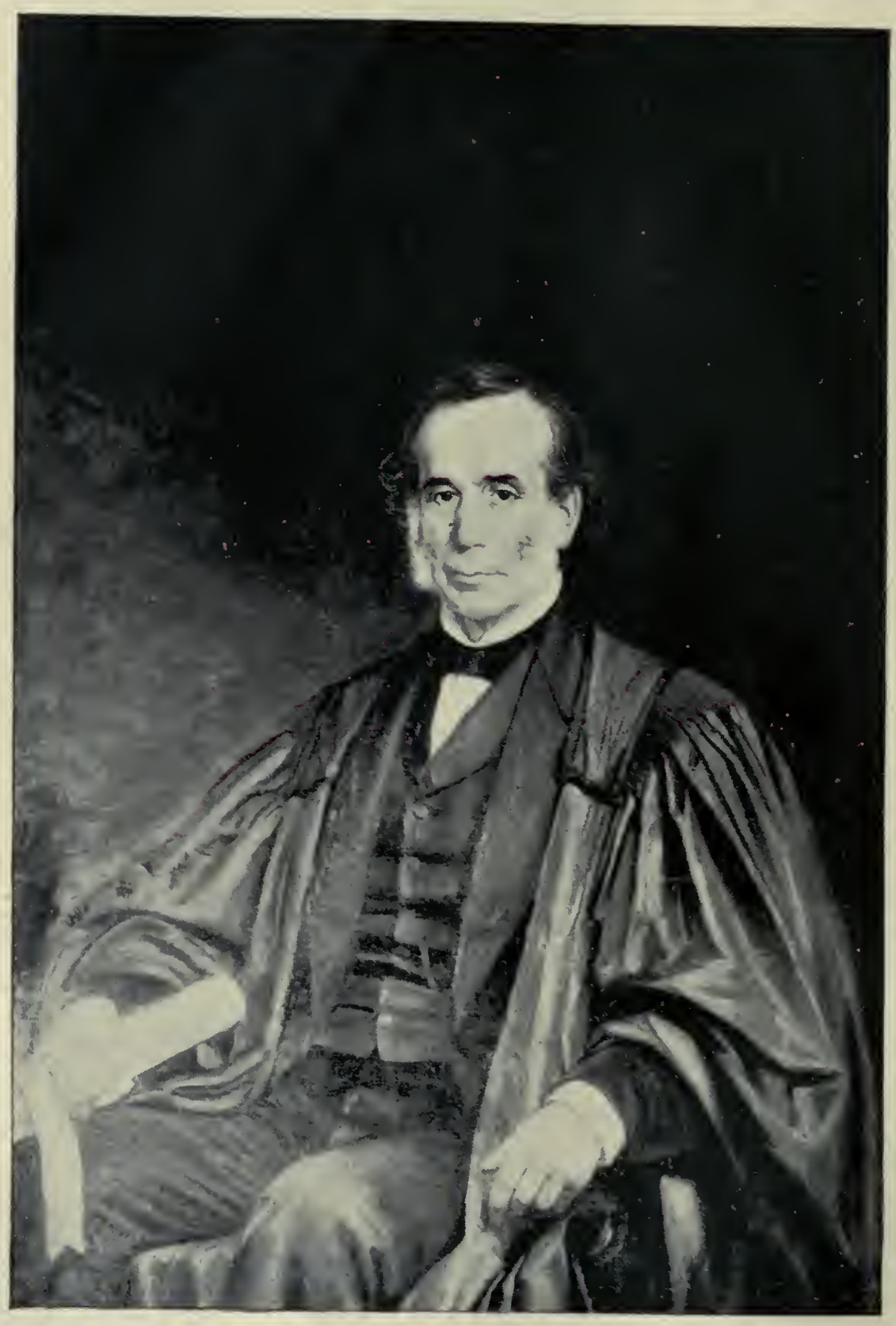

From Painting by Benoni Irwin in the Bacon Library.

PRESIDENT HENRY DURANT.

UNIV. OF CALIFORNIA

THE

Overland Monthly.

Vol. XX. (Second Series).—October, 1892.—No. 118.

Photo by W. C. Gibbs

THE UNIVERSITY OF CALIFORNIA. I.

I.

"It may be thought," says Professor Bryce in The American Commonwealth, "that an observer familiar with two universities which are among the oldest and most famous in Europe, . . . would be inclined to disparage the corresponding institutions of the United States. . . . I have not found it so. . . . If I may venture to state the impression which the American universities have made upon me, I will say that while of all the institutions of the country they are those of which the Americans speak most modestly, they are those which seem to be at this moment making the swiftest progress, and to have the brighest promise for the future." And elsewhere: "If we define a university as a place where teaching of a high order — teaching which puts a man abreast of the fullest and most exact knowledge of the time — is given in a range of subjects covering all the great departments of intellectual life, not more than twelve and possibly only eight or nine of the American institutions would fall within the definition. Of these, nearly all are to be found in the Atlantic States."

It is not to be supposed that Professor Bryce had a definite list of twelve names in mind when he said this. As he says himself, the steps by which the four hundred or so degree-giving institutions of the country fall away from the greatest universities to the least pretenders, are indefinable. Half a dozen institutions,— Harvard, Yale, Columbia, Johns Hopkins, Cornell, Michigan, — we should all name at once as the great universities of the country: for the next half-dozen, we should hesitate and disagree. The rank of a university rests on a composite basis of

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NORTH HALL AND THE HARMON GYMNASIUM.

its wealth, its numbers, its breadth of courses, its provision for graduate work and for research, the distinction and power of its teaching force, and something not exactly expressed in all these, that I may call its spirit and traditions. Some of these excellences are matters not to be settled by the figures of annual reports; and even in respect to those that are mere matters of record, one university may excel on one side, another on another side, and neither clearly rank the other. The half dozen I have named, it is true, exceed all others in the country in numbers, advancement, general scholarly repute, and (except Johns Hopkins University) in wealth; but as among themselves, no one is distinctly eminent. Columbia is the wealthiest; Harvard and Michigan are alternately the most numerous; Harvard has the highest matriculation requirement; and Johns Hopkins the most advanced range of graduate work and research. The Clark University, though too poor in money and still too much of an experiment to be ranked with the established great universities, passes any of them in the place given to research.

If one should try to name a second half-dozen, and give to each one its rank, eighth, or ninth, or tenth, among the universities of the country, it would be still more an impossible attempt. Somewhere in this group, however, the University of California would fall, judged by any measurement.

By wealth: — the American universities that have incomes of over $200,000 a year are: —

THE CHEMISTRY BUILDING.

1.	Harvard	$1,026,738.20	(1890–'91)
2	Columbia	800,000	
3.	Yale	499,720	(1891)
4.	Michigan	400,000	
5.	Cornell	350,000	
6.	California	306,611	
7.	Pennsylvania	275,000	

Where round numbers are given, the figures have been brought up to 1891–92, as nearly as I could estimate by the items of gifts received, or enrollment of students, affecting the income from tuition. In the case of California, I was able to obtain the estimate for the current year. This may give it a slight advantage in the comparison, as all these institutions are increasing more or less

STILES HALL, THE HOME OF THE COLLEGE CHRISTIAN ASSOCIATIONS.

rapidly in wealth. The same advantage, of figures later by at least half a year, is unavoidably given California in all the comparisons.

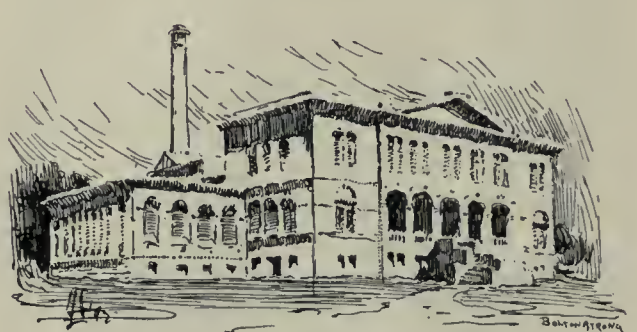
The following universities have incomes between $100,000 and $200,000, according to the latest report of the Bureau of Education; this report is three years old, but I do not find elsewhere reason to think the figures have changed much: —

8.	Wisconsin	$182,987	(1889–90)
9.	City of New York	148,560	
10.	Boston	127,523	
11.	Nebraska	117,500	
12.	Johns Hopkins	113,702	
13.	Vanderbilt	101,500	

THE BACON LIBRARY.

I could find no financial statements from Princeton; nor are any made by the Leland Stanford Jr. University. So far as can be conjectured, these two and the Chicago University have incomes between $100,000 and $200,000. The universities of Minnesota, Iowa, Kansas, Mississippi, and four or five religious colleges, of which Dartmouth is the only one well known, have from $75,000 to $100,000 annually. There are 20-odd State universities that run thence to $25,000 income; and some 350 private colleges, most of them still poorer.

Where incomes depend on legislative appropriations, they are liable to so much variation that any such comparison would be worthless; but none of the incomes above $200,000 are thus dependent. The University of California draws its income from invested funds, and from a tax of one cent on each $100



THE NEW ELECTRICAL BUILDING.

of the State assessment, making an income not only very secure but certain to increase for many years.

With the same tuition rate as at Cornell, this University would have as large an income. California, the Leland Stanford, Jr., and the small University of Kansas are the only institutions among those named above that do not charge regular tuition, though the fees are very light at Michigan.

The comparative wealth of universities is not necessarily quite as their income, for the difference in value of grounds, buildings, and equipments, is considerable. Thus I have ventured to get a rough estimate of what may be called total wealth, by putting together the value of grounds and buildings, funds, and capitalized value (at a uniform rate of five per cent) of income from other sources, as I could gather these items from their reports,—an estimate with too many assumptions to be of much value: —

1. Columbia	$18,000,000
2. Harvard	16,700,000
3. Yale	11,000,000
4. Michigan	9,000,000
5. California	8,130,720
6. Cornell	8,000,000
7. Pennsylvania	6,800,000

Arranging by numbers of students and teachers: —

1. Michigan	2,693 students	(1891–2)
2. Harvard	2,658 "	"
3. Yale	1,784 "	"
4. Pennsylvania	1,764 "	"
5. Columbia	1,564 "	"
6. Cornell	1,489 "	"
7. California	1,079 "	(1892)
8 Boston	1,038 "	(1891–2)
9. Wisconsin	789 "	(1890–1)

1. Harvard	253 teachers
2. Columbia	226 "
3. Yale	225 "
4. Pennsylvania	207 "
5. California	194 "
6. Cornell	136 "
7. Michigan	149 "
8. Boston	118 "
9. New York City	90 "

The Johns Hopkins University has 57 teachers, and Wisconsin about the same number.

Proportion of graduate students to undergraduate and professional: —

1. Clark University	100 per cent.
2. Johns Hopkins	61 "
3. Columbia	12 "
4 Cornell	10 "
5. Harvard	7 "
6. Yale	4 "
7. Pennsylvania	4 "
8. Michigan	3 "
9. California	3 "
10. Boston	3 "
11. Wisconsin	3 "

All these figures give but the roughest means of finding the comparative rank of a college. All the large universities are swelled in number of students by a fringe of schools, not only of law, medicine, and divinity, but dental, veterinary, and art schools, which do not require full university matriculation, though occasionally, as in the case of the law school here, approaching it nearly. One third of the enrollment of the University of California and of Harvard, one half at Columbia, and two thirds at the University of Pennsylvania (which, indeed, consists first of all in its great medical school) are in these professional schools. In like manner, a large staff of teachers may mean that much time is allowed the members for original work, or it may only be swelled by a great many lecturers, clinical assistants, and others giving but partial time, in the professional schools; or most likely, as in the University of California, both causes unite.

Were it worth while, one might go on to compare the leading universities as to number of courses offered, or titles of articles published by their members; superficial enough comparisons, for the length of such lists put forth bears no certain relation to value.

In those less measurable things that go to make up the greatness of a university, it is safe to say that the University

of California is greater, rather than less, than its general repute,— greater than its repute in the East, because the East is ignorant of developments in letters to the westward; greater than its repute here, because we have not yet faith in ourselves in these higher matters, and lean somewhat timidly and provincially on Eastern opinion. Just as Professor Bryce found Americans most apologetic with regard to their universities,— their most hopeful institution in his judgment,— while confident enough about their politics, their press, their cities, one may find Californians bearing themselves toward their own best possession.

The opinion of men who have seen

Drawn from an old wood cut

THE COLLEGE SCHOOL.

the University at Berkeley somewhat thoroughly, after knowing the best universities elsewhere ; the ease with which its graduates compete with those of the most famous American universities in the graduate schools ; the personal caliber of its leading men, as one may justly enough measure it against that of distinguished men who visit us, or are known to us by their books, – all these means of estimating the rank of their University justify Californians in feeling that it holds a very honorable place among those of the country.

II.

The beginning of Harvard within fifteen years after the settlement of Massachusetts, "That sound learning may not perish from among us," has

Drawn from an old wood cut by Van Vleck and Keith

THE COLLEGE OF CALIFORNIA.

always been a cause of just pride ; but it was a matter of public consent and public taxation, a thing in which the whole community was at one. The founding of the College of California, if less to the honor of the community, was more to the honor of the small guard of men that achieved such results in an indifferent, sometimes even a hostile, community. And this began with the very year the discovery of gold brought the rush of Americans to the Territory, not yet a State, barely out of Mexican possession, and still under Mexican law.

In the very first of this rush, several zealous young clergymen started for California, filled with the purpose of seeing that the things of the spirit should not be forgotten in the craze for gold,— and be it said in passing, not one of them was enticed away from that purpose when they came into that fast and furious early-day life. Three of them were on the first steamer that sailed for California. At New Orleans they overtook another, a young Dartmouth man, Mr. Samuel H. Willey, who had started before the news of the discovery of gold, and who stopped at Monterey. Here still lived Thomas O. Larkin, the most important American citizen there ; a Massachusetts man by birth and breeding, though he had been years in California as United States Consul. As soon as they were fairly acquainted, the two men began to talk of founding a college. Un-

like the gold-seekers, who expected to fill their pockets and go home, these men regarded their homes as fixed here, believed in the future of the community, and meant that its foundation should not be laid entirely in materialism. On the voyage out, indeed, the passengers of this first steamer had kept the anniversary of the landing of the Pilgrims, with resolutions pledging themselves to found a State in like spirit.

There were a few others scattered about the Territory — now early 1849 — with whom Mr. Willey and Mr. Larkin communicated, and who joined in the plan at once; and during the summer of '49, in spite of the overwhelming occupations of that time, the vast roadless distances and irregular communication, they managed to shape everything in readiness to charter the college as soon as a constitution should be adopted, and a law passed for granting such charter. They secured promise of land for an endowment; they corresponded with the Harvard and Yale authorities as to method of organization (Mr. Larkin was a kinsman of Dr. Rogers, one of the Harvard overseers; Mr. Sherman Day, another of the group, was son of the president of Yale), selected a board of trustees, and drafted a law. It was to be a Christian, but not a sectarian college; all were agreed on that. Not only was the environment heavily against sectarianism, fourteen or fifteen tiny churches in 150,000 square miles of territory, making such way as they could against the reckless abundance of counter institutions; but the sentiment of the circle was

Photo by Gibbs

OAKS, LOOKING TOWARD THE CINDER TRACK.

Photo by Taber
ACTING PRESIDENT MARTIN KELLOGG.

against it, and rudimentary effort looking toward a Presbyterian college came to nothing. The sort of educated young men that were drawn to early California were less likely to be fettered by prejudices and partisanships than the average of their time. Their very first letter, written after Mr. Willey's earliest conferences with Mr. Larkin, led Dr. Rogers in his answer to warn them of the magnitude of the work of creating a university according to the highest idea then held in America of such an institution; and nothing less than the best seems to have been contemplated by them from the first.

The first Legislature met in December. A knot of the friends of the college were on the ground,—Mr. Willey riding by night and in the rain across the mountains from Monterey to get there. Their first attention was given to the interests of the future common schools, but they secured their law for chartering colleges. The law provided, as a proper safeguard, that $20,000 of property must be secured before a charter should be given. This provision unexpectedly defeated the plan for several years. Mr. Frederick Billings applied for a charter in behalf of Chester A. Lyman, Sherman Day, Forrest Shepard, Frederick Billings, and S. H. Willey, trustees; but the Supreme Court, in which the power of granting charters had been placed, decided that in the unsettled condition of titles the lands promised (mainly by Dr. James Stokes and Kimball H. Dimmick), along the Guadaloupe Creek, near San José, did not fulfill the property requirement. The result of this set-back was that the promises of land lapsed.

The friends of the college now planned

LIBRARY OF THE UNIVERSITY

to begin over again by getting a preparatory school under way. They were exceedingly busy men, in a time when all activities were carried on with an overwhelming rush and pressure: no one could take on himself the charge of establishing the school. The churches were not interested in the matter as churches; the college circle, though mostly clergymen or active members of the pioneer churches, acted as individuals. In 1851 their hope of united action for an undenominational college was broken into by the Methodists, who began the foundation at San José of the "California Wesleyan College," afterward the "University of the Pacific."

The idea of State aid evidently hovered somewhat about the minds of the college-builders from the first, but it was always discouraged by their Eastern advisers. It was at a time — after the colonial colleges had detached themselves from public control, and before the day of State university success — when there was a strong reaction against allowing the State any hand in the higher education. They themselves, in spite of the unsectarian spirit of their plan, were loath to think of excluding religious instruction altogether. "Mental and Moral Philosophy and the Evidences of Christianity," were the subjects of Doctor Willey's central regret when the College passed into the hands of the State,— a wasted regret as far as the philosophy is concerned, for that is taught freely in State universities now; but many adjustments that have since been learned seemed impossible then.

From Painting by Keith

JOSEPH LECONTE, PROFESSOR OF GEOLOGY AND NATURAL HISTORY.

On the May-day of 1853 a rather remarkable thing happened. A scholarly looking stranger,— "in appearance the very embodiment of the ideal college professor," — came up from the just-arrived Panama steamer to Mr. Willey's house in San Francisco, bringing the best of letters from New England, and said that he had come to work for a college, and wished to begin at once. This was Henry Durant: "a man first fine, and then re-fined," President Gilman said to the students when he died; an example to them of the result of making the highest choices, mental, moral, and social, for generations.

He was born at Acton, Mass., June 17, 1802; educated at Phillips Academy, Andover, and at Yale, where he graduated in 1827, in the same class with Horace Bushnell. He was four years a tutor in Yale, then studied theology there, was ordained and settled as pastor at Byfield, Massachusetts; and after quietly ministering there for fifteen years, this serene clerical scholar already more than fifty years old, departed from that quiet harbor, and set out to the remote California of 1853, "with college on the brain," he said. It was surely one of the most curious and honorable incidents in the history of college founding.

A month later, he began a "college school," of three boys, in a building in the new hamlet of Oakland, which he had rented for $150 a month, gold coin, payable in advance; the house to be kept by a man and his wife whose wages were to be another $150, gold, in advance. Mr. Durant was the oldest Californian of them all, or the youngest man of them all, as far as venturesomeness was concerned. Twenty years later, President Gilman, after trying in vain to get him to write down some of his experiences, persuaded him to talk before a stenographer. The stories thus preserved have been told several times in print, but there are new readers each time, and those who are familiar with them will pardon me for not leaving them out. The school had not gone on three months before there were arrears.

"My housekeepers — Quinn was the man's name — began to be alarmed. He said that whatever did not succeed in two months and a half in California never would succeed. He could not trust me any longer. One morning I went up-stairs as usual to my school. It got to be time for luncheon, and I went down-stairs, and found nothing prepared. Quinn had squatted on the lower part of the house, and put out his shingle: 'Lodgers and boarders wanted here. Drinks for sale at the bar.' He had got up a bar-room with his bottles in it. I sent out to a restaurant, and got a luncheon for the boys. Then I went down-town to a lawyer's, and entered a complaint before a Police Court extemporized for the occasion. Quinn was summoned to appear. He was found guilty of getting up a nuisance, and was ordered to desist and pay a fine of $5. Meanwhile I went up to clear out his fixings.

"He came up, and wanted to know what I was about. I told him what I was going to do. He told me to desist. I told him that I had made a beginning,

From Painting by H. Raschen
PRESIDENT JOHN LECONTE, PROFESSOR OF PHYSICS.

and was not going to stop until I had made an end of it. He got into a rage, laid his hands on me with considerable force, and was pushing me away, when suddenly he became pale as a cloth, lifted up his hands over his head, and began to pray. He begged that I would pray for him that God would have mercy on his soul."

"I suppose he had a dim vision of the future glories of the University of California," President Gilman suggested, in play.

"No," said Dr. Durant, quite seriously, "I think it was not that. His religion came to my relief. He had an impression that he had laid hands on a consecrated person, and thought he was committing the unpardonable sin. He regarded me as a priest, and had been so taught. I think that was the secret of it. He told me I need not trouble

myself to move the things; he would do it."

While going on with the school, Mr. Durant was looking for a permanent site, and selected a spot on a new road, now Twelfth Street, about to be opened to what was then San Antonio.

"Just at this time, 'the jumpers,' as they are called — a certain order of squatters — assembled in pretty large numbers at the end of Broadway — two or three hundred of them. It seems a plan had been arranged, and they had been gathering in small numbers until there was a large crowd of them. They were discussing, haranguing, and working themselves up to the point of taking possession of all the unoccupied grounds in Oakland. Learning what they were about,— that they were about to take possession of the various lands of the city, and divide them off by drawing lots, giving each one something,— I went down into that crowd, took off my hat, got their attention somehow, and proclaimed that negotiations were pending for the purpose of securing four blocks that had been selected for the purpose of building a college. A motion was made that three cheers be given for the coming college. A committee was appointed to take charge of these four blocks, to keep them safe from interference from any quarter, and to hold them sacred to the use for which they had been voted."

The old circle of friends backed Mr. Durant cordially, and now a subscription was raised to put up a building on the site thus obtained. The funds ready in hand gave out before it was quite complete. Contractors had been known in such cases to borrow the money to finish, take a lien on the house, put in a man with a pistol to keep the owner away, and ultimately get the house. Mr. Durant suspected that something of the sort was breeding, and consulted a lawyer, who advised him to regard himself as owner and take possession.

"I came over at night, took a man with me, went into the house, put a table, chairs, etc., into one of the rooms up-stairs, and went to bed. Pretty early in the morning the contractor came into the house and looked about. Presently he came to our door. Looking in, says he: 'What is here?'

"I was getting up. I told him I did n't mean any hurt to him, but I was a little in a hurry to go into my new home, and I thought I would make a beginning the night before. I asked him if he would not walk in and take a seat. I claimed to be the proprietor, and in possession. He went off. My friend went away, and in a little while the contractor came back with two burly fellows. They came into the room, and helped themselves to seats. I had no means of defense except an axe that was under the bed. The contractor said to one of the men: 'Well, what will you do?' Said he: 'If you ask my advice, I say, proceed summarily,' and he began to get up. I rose, too, then — about two feet taller than usual; I felt as if I was monarch of all I surveyed. I told him that if I understood him, he intended to move into the room. Said I: 'You will not only commit a trespass upon my property, but you will do violence upon my body. I don't intend to leave this room in a sound condition. If you undertake to do that, you will commit a crime as well as a trespass!'

"That seemed to stagger them, and finally they left me in possession."

This house is the square one shown in the sketch, p. 341, which is from an old engraving. The school prospered, and after a while money enough was raised for a second building. In 1855 the College of California was incorporated, and then a search was begun for a fine, ample, well watered tract, which by beginning thus early might be secured for a permanent site without extravagant cost. It chanced that in 1856 Dr. Horace Bushnell was sojourn-

ing in California for the sake of his health, and became an enthusiastic ally of the college. He took on himself the investigation of sites, and by stage, in the saddle, on foot, explored the whole circumference of the bay, and the Napa and Sonoma valleys, reporting in writing on all suitable sites. The letters written during the many weeks of these tours form an interesting chapter in his "Life and Letters." The final result was the selection of the present site of Berkeley. The name was not given till ten years later: it was suggested by Mr. Frederick Billings, in memory of Berkeley's well-known stanzas, beginning,

> The Muse, disgusted at an age and clime.

They are curiously appropriate, and as one will see on glancing them over seem in some respects written rather for California than for the Atlantic States.

Before leaving the State, Mr. Bushnell wrote an "Appeal" to the public for the college, from which I quote a passage or two:—

> They [the trustees] propose to create not an academy only, nor a high school, but a college; nor this only, in its most limited and historic sense, but a college that will be the germ of a proper university, and will not fulfill its idea till it becomes on the western shore what Harvard and Yale are on the other; and finally, such as even they are not, except in a rudimental and initial way.

They are not unadvised, the appeal goes on to say, of the immense expenditure necessary; and it is curious in view of the figures quoted in the beginning of this article to see his illustration of the cost of a great college:—Harvard, he says, has about a million and a half of property, $600,000 in active capital, and still complains of sore restrictions for want of means; the College of California should have $500,000 to begin with. He warns against a State university, and gives a vivid picture of the conditions of such,—the students rushing into the cabals of party to oust some obnoxious president or professor, learning and science draggling in the mires of uneasiness and public intrigue.

> The sooner, therefore, you are disabused as a people, of any expectation of a university to be created by the State, the better it will be for you. It can have no other effect than simply to postpone those private responsibilities which have been too long delayed already. You can never have a university worthy of your place as the central and first State of the Pacific, unless you call it into being by your own private munificence.

From Painting by Benoni Irwin
PRESIDENT DANIEL C. GILMAN.

None the less for some prophecies now falsified, the appeal is a noble document,—one of the finest papers connected with the history of the University. The students of the University should be kept familiar with it, if merely as literature.

In 1860, a Freshman class of eight was ready, and Mr. Durant turned over the preparatory school to Rev. Isaac

Photo by Taber
EUGENE W. HILGARD, PROFESSOR OF AGRICULTURE AND AGRICULTURAL CHEMISTRY.

Brayton, and began college work. Mr. Martin Kellogg (Yale, '50) was called from his church in Grass Valley, and Mr. Brayton also gave some time to the college classes.

From this time the college went on as a separate institution for nine years, increasing its staff and the number of its students, having a good repute educationally, and holding its main requirements well up to the best standards of the country at that date. So many of its nearest friends were Yale men,— Professor Durant, Professor Kellogg, Sherman Day, Doctor Benton, Doctor Bushnell, and a number of others,— that it took a decided Yale coloring, of which glimpses are even now discernible through the various superimposed layers. If any shadow ever disturbed the perfect confidence and unanimity — even affectionate regard — among the builders of the College, the memory of it has not been kept. I should think such a group of men, so cordially united and to such ends, must be rare in the early history of communities.

The College never had a president. After two or three years, Mr. Willey was urged to become "vice-president"— acting president, we should say now — till the place could be filled. Doctor Bushnell, Doctor Shedd, and Doctor Hitchcock, were successively asked to take it, but would not leave the Eastern environment for that of California. Professor Durant seems to have regarded himself and to have been regarded as a teacher, not an administrative manager.

There was no endowment, and the College was never free from financial struggle. By the time it was incorporated, the "flush times" had passed: "I know very well," says Bushnell in his appeal, "the heavy pressure now felt of debt and discouragement, the devouring rates of interest, the depressions of prices, the uncertainties of titles, the cessations of profits, and the general collapse of all that can be called prosperity. There could not, therefore, be a worse time, many will say, for the endowment of any such institution." Appeals made in the East for endowment by Professor Kellogg and Mr. Willey, backed by President Woolsey, President Hopkins, Doctor Leonard Bacon, Professor Park, Doctor Storrs, and others, failed to bring forth the help usually given in the East to Western educational beginnings. It seems strange to them to this day, and they attribute it — as did the people to whom they talked — to the feeling in the East that it was absurd to send money to *California*, the place that gold came from. Perhaps the non-sectarian character of the College had much to do with it: a non-sectarian institution gets praise and public sympathy for its liberality, while the money goes to the sectarian ones; the church people feel that their "first efforts are due to their own," and the non-church-going people, in New

Photo by Waters

HUGGINS BRIDGE OVER STRAWBERRY CREEK

England at least, do not give as largely in any case. With slight exceptions, all the funds for the College of California had to be raised here, in a period that covered the time of the great depression spoken of by Doctor Bushnell, the war time, and the first years of recovery from the war. A great deal was raised. Two good buildings were put up in Oakland, the site at Berkeley, with a good deal of adjoining land for residence lots, was purchased, a plan for laying out the grounds by Frederick Law Olmsted obtained, extensive water rights secured, and the College carried on for nine years. All this was done by continuous subscriptions from business men — as usual, not the wealthiest ones, but generally the well-to-do. Many weeks the acting president walked up and down the streets, climbing to men's offices and obtaining these subscriptions. Nor was the effort to get large endowments ever relaxed; among others, several men were appealed to who have since become founders of other institutions; but none of them at that time was at all moved. In 1867 the trustees faced the situation that their property, though not inconsiderable, consisted entirely of real estate, which at present yielded no income, and that their current expenses had with the growth of the College risen beyond what could be met by subscriptions any longer. Indeed, they were already in arrears.

III.

In 1862 Congress passed the Act giving those States still containing public lands a grant of such lands for purposes of instruction in Agriculture and Mechanic Arts. California had also a small Seminary Fund, which, set apart for no very specific use, had been allowed to accumulate. The State soon began to try to avail itself of the national grant, but the Legislature could come to no agreement about it, and after the matter had been reported back from various committees, it was finally turned over to a commission, at the head of which was Professor J. D. Whitney, then on the Geological Survey in this State. This was in 1863. This commission drafted a plan which resulted in the Act of 1866, establishing a College of Agriculture and Mechanic Arts, to which Mining was added, and constituting a board of directors, presided over by the Governor. This board had power to locate and organize the school, provided only that it should not be connected with any other institution of learning, nor be in any manner connected with or controlled by any religious sect.

Why the provision against connecting it with any other institution was put in, I do not know, nor whether it was due to Professor Whitney: it could not have been intentionally directed against the College of California, nor intended to check the expansion of the agricultural school plan into a university, for Professor Whitney, in an address to the College, had spoken with a good deal of approval of State universities.

The success of Michigan University, which was founded before the reaction against State aid set in, had greatly tempered that dread everywhere. In the West it was now felt to be a less danger than the multiplication of private and sectarian foundations it had led to. The trustees of the College of California had not failed to note all this; and other guests of distinction besides Professor Whitney had called their attention to it, notably Professor Silliman. In any event, if a State university were really to be started, the one great university on this Coast, which had always been their goal, would become impossible except by consolidation. The terms of the Act of 1866, however, and the evident intention of making a merely technical school, seemed to put out of the question any thought they had had of such an event.

Governor Low, however, the head of the board that had charge of organizing the school, was as it chanced one of the firmest friends of the College, and a regular subscriber to its funds. He was also much disposed to a State university, instead of a State technical school. It was legally possible so to construe the act under which the "College of Agriculture, Mining, and Mechanic Arts" was organized, as to make it a sort of university, by the addition of minor courses of liberal arts, even without other sources of income than those provided for by the Act. There was no obstacle whatever to making these industrial courses even a minor part of a great university, if the additional income demanded were provided for elsewhere. There would be room for some delicate questions of division of funds, but nothing that could not be settled by honest effort. When the directors of the proposed school had fixed upon a site two miles north of Berkeley, the nearness seemed to bring to a focus the floating talk there had been of consolidation, and Governor Low apparently was the one that made the definite suggestion, while talking over the financial difficulties. The form of the law seemed to forbid it, but there was one way in which it could be done: the College could give its property to the State, on a clear understanding that this should be made the fulcrum for turning the technical school into a university. Desire of seeing all forces united on the one hand, financial pressure on the other, settled the matter. It was necessary to shape things quickly, for the Legislature was soon to meet. The trustees of the College and the directors charged with organizing the technical school came to a cordial understanding: and on October 9th, 1867, the trustees adopted resolutions offering their property to the State. The first resolution offered the site at Berkeley without condition; the second declared that "in making this donation, the College of California is influenced by the earnest hope and confident expectation" that the State would forthwith establish on this site a university, which should include several technical colleges, and also an "Academic College"; the third, that the trustees would enter into contract that upon the establishment of such university they would disincorporate, and turn over all their remaining property to the university.

Photo by Taber
BERNARD MOSES, PROFESSOR OF HISTORY AND POLITICAL ECONOMY.

These resolutions were formulated by John W. Dwinelle, and the trustees of the College were a little disappointed at the precedence given the technical "colleges" over that of liberal arts; but on the representation that it was necessary thus to present it to the Legislature, they yielded the point. It may seem that the unconditioned gift of the site in the first resolution left them at the mercy of the Legislature in case it chose

to accept the site and decline to fulfill the "expectation" of the second; but as a matter of fact the offer was conveyed to the Legislature incorporated in a bill for the establishment of a university which should include the school of technology already provided for. The bill was endorsed by the directors of this school, included provisions for the appointment of regents, and had been agreed upon in consultation with the trustees of the College of California.

The bill did not pass without opposition,—one scheme was presented for breaking up the property into a series of schools, scattered about the State. Mr. Willey went up to Sacramento, and did what he could for its passage; and Mr. Dwinelle and Mr. Felton carried it through. It passed March 21, and on the 27th, an appropriation was made for the support of the proposed university. The date of the Governor's signing the bill, March 23, has since been celebrated yearly at the University as "Charter Day."

This great step safely accomplished, the next was the appointment of regents. Six of these were — and still are — *ex officio;* sixteen are now named by the Governor, and confirmed by the Senate, but at first only eight were chosen in this manner, the other eight being selected by the board itself.

Mr. Low was no longer Governor. Governor Haight had been elected while the arrangements with the College of California were going on. He was a graduate of Yale, a man interested in education, and of liberal ideas; he had in his inaugural address urged the University bill, as did Governor Low in his retiring address. He had cordial personal acquaintance with members of the College of California board; but he had not followed the course of the College as closely as Governor Low.

When Governor Haight's appointments came out, there was some surprise at them. The regents named, and those in turn named by them, were good citizens and earnest friends of education,

Photo by Waters

THE UNIVERSITY AND THE GOLDEN GATE.

but they were not the men that people expected. For one thing, there was but slight representation of the College of California on the board. I have taken some pains to talk with friends of Governor Haight about these appointments, and I am satisfied that from his point of view at that time the College did not play any very large part in the University question. It had been possible for himself and other friends of the University to make use of its gift in bringing about this great foundation, but the gift itself he and the others about him did not regard as of much value. The College was crippled with debts, and though it had property enough to cover them it was all in real estate, that might not be available for many years, while the debts would have to be paid at once by the State. The College came before him with the aspect of financial failure. Its aims were lofty, its men to be revered; but it had not "got there." It was first of all necessary so to organize the University that there should be no failure in practical efficiency. There was an important endowment to come into the management of this board, and in such a shape that it might be frittered to nothing, or nursed to something very large. He meant, first of all, that the endowment should be safe; he did not wish a board of clergymen and scholars, but of financiers. Then, too, he felt under certain restrictions of selection: the majority of the board must be of the dominant party; probably the Legislature would not have consented to anything else. In this case the dominant party was Democratic, and as the College of California men were almost exclusively Republicans, five out of the eight nominations necessarily went away from them. Governor Haight was a Northern Democrat himself, but the Southern Democrats were a strong body in the State, and had to be considered. Between this wing of the Democracy — pro-slavery men in the earliest California struggles, secessionist at the time the State was with difficulty held in the Union — and the New England men in the State, there was little sympathy; without actual antagonisms, they still fell into different social groups, and did not come naturally into co-operation. In spite of the most faithful effort to be non-political and non-sectarian, the College of California had by sheer force of gravitation become mainly Congregational, and almost exclusively of New England. This Governor Haight intended to break up; he meant to make the University as broad-based as the population of the State. He planned to represent North and South, Catholic, and Protestant, and Jew, on the board. It was all good and wise; but after talking with those who can give me light upon it, and reading over the first volume of the records of the board, I am forced to conclude that among these adjustments he failed to make enough of the need of university knowledge in such a body. The men in California who had studied college plans closely, and had advised constantly for years with college managers in the older States were not on the board. The difficulty was in some respects impossible of solution: in 1868 New England was the only section of the country that had universities, and a board fairly distributed sectionally could not be the most skilled in college management.

This first board contained many admirable men, several of them ideal regents. But as a body they — or so their record impresses me — took hold of the work of laying the foundations of the institution with an inadequate sense of its difficulty, except on the financial side. The pages are filled with notes of their careful consideration and re-consideration of sales of lands; but their first important step educationally was — in open meeting, without even nominations at a previous meeting, much less a committee to correspond and consider — to elect a president. They elected General McClellan,

and ex-Governor Low resigned in consequence, — the first ripple of political trouble, which afterward was abundant enough, from outside the board at least. General McClellan declined, and though there were a good many nominations, no president was actually elected till after the organization was complete.

Meantime, November 10, Professor Kellogg was nominated to the chair of Ancient Languages, and elected December 1. At the intervening meeting, Professor John Le Conte, whose name had first been brought before the board by a letter from Professor Pierce, of Harvard, was nominated and elected, thus becoming the senior professor. On December 1, also, Professor Joseph Le Conte and Professor R. A. Fisher were nominated and elected.

During this year of 1868–69 the College of California was asked to continue instruction, while—the gift of the site having been accepted — the offer of the remaining property was held under consideration. It was accepted on April 5, 1869, and the University advanced the money for payment of arrears during the year; while the professors so far chosen for the University gave instruction in the College. It was agreed that the University should take over unbroken the courses of the College, which, in fact, would practically constitute the "College of Letters." In some of these negotiations, the regents seem to have been unnecessarily curt with the College; but one learns it only from the regents' own record; the College trustees carried their part of the negotiation through, so far as appears, with an unfailing urbanity and readiness for concession that doubtless had joint origin in their financial disadvantage and their anxiety to fix the course of liberal arts firmly in the University, at the cost of whatever other sacrifice. In their formal acceptance of the College, however, the regents express "their profound appreciation of the far-seeing public spirit, devotion to learning, and to the good of the Commonwealth" manifested in the resolutions of gift; their recognition in those resolutions of "the incipient germ of the State University"; and their intent to "preserve, cherish, and carry forward to posterity those trusts in the same enlightened spirit in which they are confided to us."

The presence on the board of Dr. Horatio Stebbins, president of the College trustees, was the thing that especially helped in all adjustments. Dr. Stebbins is still on the board, an active and valued member. In November the consolidation was completed, the total liabilities accepted by the regents being reported to the Legislature at $49,030.04, against a value of $80,000, exclusive of the two sites in Berkeley and Oakland, which four years later were reported as worth $350,000.

I have more than once asked why, with a property of so much real value in spite of embarrassments, the College of California could not have taken stronger ground. Any one who has had to do with business men, however, knows the light in which they look upon a property whose values are not yet available, and which is in distress for immediate funds. And there was a still more potent difficulty in this case: the offer of the property had first of all to pass a Legislature which had no great desire to see a University founded, and was ready to be deflected by a feather's weight from considering it at all. Some light is thrown on this point by the fact, of which I am credibly told, that certain of the worldlier friends of the proposed university were obliged to use some sharp politics to prevent the defeat of the whole plan in the interest of other sites, which men with land adjoining were anxious to present.

It may be said, therefore, that the price received by the College for the Berkeley site was the establishment of a university instead of a technical school; and for the remainder of the property, the privilege of organizing the course of

the "College of Letters" in accordance with their own standards, Professor Kellogg passing over into the University to do this. The importance of this privilege may be measured by the fact that for some years the matriculation requirement for the classical course was higher by a full year than that for the other courses; and this was doubtless the most potent means of drawing up the others to the same standard. The thing that the College men desired in addition to receive, and were disappointed in not receiving, was a guarantee of the security and prominence of the course of Letters.

In 1869 the University opened its sessions, Professor John Le Conte acting as president. Professor Le Conte had also been charged with the organization of the courses, the planning of the buildings, which were now under way, and in general the mapping out of the University. The regents were fortunate in his broad-minded and scholarly counsel. The faculty was filled out with several more appointments, and the sessions opened with unshadowed promise.

IV.

In January, 1870, Mr. Tompkins succeeded in obtaining from the Legislature an additional endowment of tidelands. The dependence on the Legislature was bound to be close, for appropriations were needed from time to time, and the very organization and existence of the University rested on a law, which could be repealed at any time. Mr. Tompkins became the guardian of its interests, perhaps its most effective friend, during the remaining years of his life. He was a Union College man, born in Oneida County, New York,—"a student of literary and philosophical subjects, an earnest advocate of the higher education, and the generous friend of all good undertakings in the community where he dwelt." I quote the resolutions offered by Dr. Stebbins in the board of regents when Mr. Tompkins died, nearly three years after this. It was a most fortunate thing for the University that it had his services for these few years, but most unfortunate that it lost him when it did, before the time of its great struggle with the Legislature.

In this three years Doctor Durant had been made president of the University (Aug. 16, 1870); had retired after two years of service, being then just seventy years old; and after a few years, during which he dwelt, a venerable and honored figure, in Oakland, giving to its young people a little of that training in reverence that is common in the older college towns, he died suddenly, January 22, 1875, while presiding at a dinner of the Berkeley Club, and speaking on the subject, "The Good Time Coming." He was Mayor of Oakland at the time of his death. His theology, never very rigid, relaxed notably in his last days, and he followed his pastor, the late Rev. L. Hamilton, out of the Presbyterian Church, as a protest against the doctrine of eternal punishment.

Upon his retirement, Professor D. C. Gilman, of the Sheffield Scientific School of Yale, was elected president. He had been asked once before to take the chair, and had refused. He now accepted, and was on the ground by the beginning of September, 1872. He was received with the utmost cordiality; the regents seem to have been eager to co-operate with him, and uphold him in every way. He found the University going on smoothly enough. A preparatory department had been organized, with the strict understanding that it was to be a merely temporary arrangement, until the high schools should be encouraged to assume the preparatory work; and in fact it was dropped after two or three years, thus closing the last phase of the old College School, which had been consolidated with it. On motion of Regent Butterworth, by a unanimous vote, women had been admitted to the University "on

equal terms in all respects": this was October 3, 1870, so that it was not possible for any women to become regular students in any class before that of '74; one woman graduated with that class. An incident of the same period that may be worth mentioning is Bret Harte's election (Aug. 16, 1870) as "Professor of Recent Literature and Curator of the Library and Museum," at the highest salary given by the University,— an appointment that he, however, declined.

The University was still holding sessions in the old College buildings in Oakland, while those at Berkeley slowly progressed.

President Gilman's administration was singularly successful; a new orderliness, vigor, and aspiration filled every department. One of his first acts was to have the president invited to attend the meetings of the board, with a right to discuss; and later he was made an *ex officio* member. The records of the regents begin to be thronged with acknowledgments of gifts, large and small,— the largest that of the Francis Lieber library, from Michael Reese.[1] The curt, business-like style of their own communications changes to one of attentive courtesy, under which some old difficulties — chiefly concerning proposed affiliated schools — melted away.

But troubles were brewing from outside. The cost of the main brick building — then called the College of Agriculture — had surprised every one, and work on it had been more than once suspended for long periods. In consequence, the North Hall, then called the College of Letters, had been hastily and cheaply put up. The Legislature of 1872–73 became suspicious as to both buildings. Moreover, this was in the height of the Granger political movement; there was a sentiment of injury among the farmers easily precipitated on any class or institution. They were not satisfied with the working of the College of Agriculture, as one branch of a manifold institution; they felt that the original grant had been given for a "School of Agriculture and Mechanic Arts," and that the University should in fact be this, and this only. The State Grange memorialized the Legislature on the subject. The result was an unfriendly legislative investigation, on the two subjects of the buildings and of the instruction in agriculture and mechanic arts. One of the regents, Dr. Merritt, who had been responsible for the erection of the wooden building complained of as defective, was charged with direct fraud. He was exonerated from any such charge, and, with the rest of the building committee, from that of negligence; and the regents and President Gilman stood by him and by each other in the whole investigation. But he shortly resigned from the board, and never had anything further to do with the University; when he died, what he had to give to education went to Bowdoin College.

The other branch of the investigation did not end so promptly. Each specification contained in the inquiry had been given to the proper person, to answer by a full exhibit of the facts. The professor of agriculture, Professor Ezra Carr, answered the inquiry as to the condition of the agricultural instruction in a way that practically endorsed the dissatisfaction of the State Grange. Professor Carr and his wife, the well-known writer and horticulturist, Jeanne C. Carr, had just joined the local grange, and Mrs. Carr in especial was much in sympathy with the Granger movement. The real contention was that between the technical school idea and the university idea, which had been supposed to be settled in favor of the university, and which was now entirely re-opened. But there were already several of the faculty in antagonism with President Gilman, on personal and administrative grounds rather than matters of opinion, and Professor Carr, with Professor

[1] When Mr. Reese died, his will added a bequest of $50,000 to this gift, for library purposes.

Swinton, was among these. The regents supported President Gilman, and it was at this very time practically certain that Professor Swinton would resign, as he did the next month. The Legislature was still in session, and he joined in the attack on the University, and published a pamphlet on the subject.

The strained relations between Professor Carr and the University culminated in July, when he was asked to resign, and refusing, was removed. These circumstances excited the Grange and also some of the mechanics' bodies to great hostility to the University, and public sympathy was entirely with them. The storm of denunciation from the press was overwhelming, and most intemperate. I think that I am right in saying that the Sacramento *Record-Union* and the San Francisco *Bulletin* were the only papers of importance that did not join it. "President Gilman and the kid-glove junta," "teaching rich lawyers' boys Greek with the farmers' money,"— such were types of the daily phrases for months. There was much gross personal abuse, and pamphlets and resolutions of various bodies were added to the tirades of the press. There was in a sense no cessation of this for years; of course, the newspapers ceased in time to pay much attention to University affairs, but some of them have never ceased to fall easily into a hostile tone toward it, and when any difficulty arises concerning it they are ready to take it for granted that the University is to blame.

It was plain that the people did not desire a university. They desired to use the word, as more imposing than "technical school," and the fashion throughout the West; but they wished it to *be* a technical school. It gave displeasure that the ancient languages should be taught at all in the institution. Professor Carr was elected State Superintendent of Education as a demonstration in his favor. It was a very serious matter, for the University was really at the mercy of the Legislature, which could break it into a series of technical schools, the course which Professor Carr and his wife were then advocating; and the weight of the Granger vote alone in the Legislature was considerable.

In this crisis the conditions of the gift of the College of California rose to an unexpected importance. It was pointed out unceasingly that the site would have to be forfeited if the College of Letters were given up; besides other gifts, such as the Lieber library, given to the University as such. What would have been the result if it had come to a legal conflict, it is hard to say: the unceasing labor of the friends of the University in the Legislature, the defense of the two or three friendly papers, the courtesy and tact of the committees that received the legislative committees, and showed them the real good faith in which the departments were being carried on, and the patient good nature with which Professor Hilgard, the new professor of agriculture, conquered the confidence and friendship of press and people, carried the University safely around this, its worst point of danger.

The old College of California men, though they doubtless felt their worst fears realized, said nothing of the sort publicly, and defended the University loyally; but the religious denominations generally fell in with the popular dispraise for a converse reason: all this, they said, showed the danger of State institutions, the impossibility of preserving classical learning when at the mercy of legislatures.

Their especial antagonism was, of course, the absence of religious training, and they were unjustifiably ready to believe ill of the conduct of students of a "godless State university." The conduct of the University students, however, has been unusually good, as compared with that in other colleges, and no case to justify the worst criticism

ever gave the definite impetus to founding sectarian colleges; so that these have been slow in getting into existence, and to this day, though each denomination now has its foundation, they constitute no serious rivalry to the University.

In 1875 President Gilman received a call to found the Johns Hopkins University. It was a tempting call, for he was to be free to organize it according to his own plan, making the first real graduate university in the country. It was not to be expected that he would not accept, but it left the University of California in a bad position. It was out of the question to hope that any good man would come from the East to take the presidency. It was too evident that the University had not the backing of the people. It was not indeed certain that it would be in existence many years. The antagonisms within the faculty had not been closed by the departure of Professors Carr and Swinton. A legacy of internal feud was left, which lasted for many years, gathering itself always mainly about the question of technical as opposed to liberal education, or as it was misleadingly called, scientific as opposed to classical, — for no question of pure science was concerned. These differences involved both faculty and regents, and in both bodies there were for a long time two parties, one of which desired in all specific cases that arose the predominance of the technical, or practical, in the University; while the other stood for the policy President Gilman had left, which seemed to some at the time a preference for the liberal courses, but which I am satisfied was what it claimed to be, the restoration of these to a position of full equality. For some years the colleges of liberal arts were on the whole at a disadvantage. Up to the appointment of Professor Moses, for instance, in the fall of 1875, there was absolutely not a line of instruction in history or economics in the University

With this effort for the development of the University outside the technical courses, the later appointed professors, even of technical specialties, have been in full sympathy, but the earlier men regarded it with suspicion. As the revenues grow, and as it becomes more clearly understood throughout the country what a university is, such differences and difficulties disappear.

After President Gilman left the University, Professor Le Conte served first as acting president, then as president till 1881; Mr. W. T. Reid till 1885; Professor Edward S. Holden till 1888; Mr. Horace Davis till 1890. Since then, Professor Kellogg has been acting president. When the new constitution was adopted, in 1879, the University was firmly fixed in it, beyond further reach of legislative moods. The "Vrooman Act," approved February 14, 1887, which made that part of the income derived directly from the State come by a fixed tax instead of legislative action, was the final emancipation.

In spite of the public clamor against President Gilman, and the presence of a hostile group in his own faculty, the loyalty of the University to him was great, and the great majority of educated people and influential business men outside had especial confidence in him. The regret when he went away was sharp and bitter; in the long struggle that followed, he was always looked back to as the lost leader; and by the time that reports of his Eastern success (which his friends did not fail to see thoroughly and reproachfully "rubbed in") had awed detractors, the period of his administration became the golden age of University tradition to a degree that made a real embarrassment to successors, — it has been said to me that President Gilman himself would be at a disadvantage here in competing with the Gilman tradition. The University has, in fact, at no other time had, or understood itself as having, a per-

manent president. The successive men in the chair have taken it, as Doctor Durant did in the first place, to bridge a gap and keep things going, or with a sense of experiment on both sides. It is this condition of affairs about the presidency that now chiefly keeps up in the public mind the discontent with the University that began in resistance to the widening of courses.

Yet, if one will look at net results, the achievements of the seventeen years since President Gilman went away have been enormous.

The growth in wealth and numbers speaks for itself. The freedom from political meddling assured by the present arrangement of income, and by constitutional provision, is a gain simply inestimable, and perhaps the real turning-point in the history of the University. The accrediting system that now binds together the high schools and the University assures it such a corps of preparatory schools as no other university in the country has, and makes it give such service to public school education as no other does. A little of this growth is the inevitable result of time, in scattering alumni throughout the State, to become defenders of the University. Much of it has come from individual good things done by successive presidents, though no continuous policy was possible. Still more has been done by certain members of the faculty, who with a wisdom and devotion that have never begun to be appreciated, have carried up their own departments, smoothed over differences, and by mutual consultation and agreement given the University a steady and upward policy, without any continuous executive head, and through difficulties greater than those that have half-wrecked some universities. I think the whole faculty would agree that the chief credit of this is due to Professor Kellogg.

The regents, in the last analysis, must take the honor of having made a success of the University. Yet the difficulty about the presidency shows that there is a weakness somewhere. Other universities have trouble in finding the right president and keeping him, but not such trouble as we have had. The press, since its great blunder in the case of President Gilman, has been disposed to support the successive presidents, and lay the blame on faculty and regents :— the faculty is insubordinate, and broke down this president ; the regents meddled, and broke down that one.

There is a certain knowledge of the facts in this : insubordinate is a foolish word, because a faculty are not the underlings of a president, but the faculty has never been well in harmony with any administration until the present one; and the regents have felt it right, in the unsettled condition of the presidency, to assume a minuter control of things at Berkeley than they were really competent to do. But neither of these things is a cause, but a result, of the failure to settle the presidency question. Let me say frankly, the real difficulty has been that the regents have not been good judges of men for university purposes. They have come out all right in the long run, and made a good faculty ; but they have come slowly to see which men to trust for wisdom and fairness, and which ones to check, and have bred confusions in learning. They will come out all right with the presidency, but after years of experiment most trying to every one concerned, and hampering to the University. Of the successive presidents, every one was an able man, and most successful in his own special work,— not one was primarily a college president ; not one had had training inside any great university elsewhere within recent years, nor followed the developments of university administration. Not one was first carefully chosen by the regents,— with reference to his *special* qualifications for the place and with full regard to the wishes of the faculty,—and then strongly supported by them. This experimental

way of treating the presidency grew, I believe, from that same underrating of the importance of this part of the work that was visible from the first. The names that have been put in nomination for the presidency first and last make instructive reading. The early regents nominated each other; they nominated military men whom they admired; normal school principals; personal friends. For many years after President Gilman went away a large minority of the regents were possessed with the idea of disregarding scholarship and knowledge of universities altogether, and choosing a man for industrial success or enthusiasm for the industrial arts. The recurrent fear that some such destructive blunder would be made — though in fact it never was — has injured the relation of the faculty to the regents, lowering its confidence in them as a body.

In this insufficient appreciation of the importance of a university within itself — its men, its traditions, its courses, its ideals — the regents simply represented the public. They have been chosen by successive governors, sometimes carelessly, oftener to guard the University funds, as they have done with unusual devotion and skill, perhaps greater than any other State university has had at its service; rarely for knowledge of and sympathy with university ideas. The pressure from the public has always been against respect for scholarship (in itself considered,— fame and success through scholarship secures public following), and against respect for the dignity of a university and its men. "What difference does it make what the hired men over at Berkeley think about the president that is to be given them?" asked a leading journal, hearing that some of the faculty had addressed the regents on the subject.

I can make the criticism of the regents with the better grace, because it is now a thing of the past. They are seeking, with the utmost deliberation and care, with full consultation with the faculty and inquiry about other universities, for the best president. Either of the two men between whom they will almost certainly choose,— Professor Kellogg and Professor Moses,—will be a safe and able man in the chair, and both are thoroughly familiar with the University and its needs. Each is the superior in some respects, and there will be difference of opinion to the end as to which should be chosen: but whichever it be, he will be loyally supported by faculty and regents. During the two years of Professor Kellogg's acting presidency, the last remnants of old controversies have been smoothed away, and if the newspapers will refrain from re-creating them there is no reason to expect new ones. The tone of several of the papers has not been good; they have denounced the regents for their wise delay and long inquiry; they have gossiped of the preferences expressed among the faculty, as if their now thoroughly self-respecting and mutually respectful differences were a political wrangle. Yet even the papers mean reasonably well by the University now, and we may expect that a few years more will see their relation to it as wonderfully improved as its relations within itself have become.

The appointment of alumni upon the board of regents has been a great cause — perhaps *the* great cause — of the bettered conditions: and though others may deserve the credit as much, it is certainly the general disposition of those who watch University affairs with interest to give it very largely to Regent Rodgers, a graduate of the Class of '72, now a most active and earnest regent, cordially trusted by his colleagues, the faculty, and the alumni,— three bodies between whom he and the other alumni regents supply for the first time a link.

Some reasons have existed in the construction of the board for a slower understanding of the conditions of the University. It is a very large board —

twenty-two members; different members are present at different meetings, and points already nearly settled are liable to be unsettled over and over, to the annoying delay of all business. It has six *ex officio* members, who come in and go out in a body every four years. A constitutional change, cutting off all the *ex officio* members but the Governor and Superintendent of Instruction, reducing the number of appointed regents, and giving the alumni the election of one half, would probably complete the long process of bringing the University into thorough working order. The long terms, sixteen years, have so far been the salvation of the board, giving it permanence, and enabling it to learn the lessons of experience.

V.

I have left myself little space to speak of the organization and work of the University. It resembles Cornell and Michigan most in general plan. It has, by its original scheme, six "colleges" or groups of courses,—the colleges of Agriculture, Mechanics, Mining, Chemistry and Engineering, and the College of Letters. The College of Letters has varied courses within it. The organization has become cumbrous, and were it not rooted in the State Constitution would be replaced by some simpler one, probably an adjustment of the group system. There is so large a range of electives, however, that entire freedom of choice in studies exists; a certain minimum of mathematics and of English is required for any degree, but students not asking degrees are under no restriction whatever. The degree of A.B. is not given without Greek; other degrees — B.S., B.L., Ph.B. — are given in other courses. The University is regarded strongest in the department of history and economic and social science, under Professor Moses. It is weakest in pure science, although the presence of the Le Contes has obscured this fact. The College of Chemistry is one of the technical colleges, intended as a preparation for economic and professional uses of the science; there is no course in which pure science predominates. This is a result mainly of the early devotion to "practical" studies; science that led to no visible economic result was not valued. The faculty is well aware of the deficiency, but has not until lately, been able to remedy it. Courses in botany, physics, and astronomy, besides Professor Le Conte's courses in geology and zoölogy, have always been given, and biology is now added. Since the establishment of the Lick Astronomical Department, of course, the work in astronomy is very extensive, but that is rather in the line of research than of instruction. Full and successful courses in philosophy are offered by Professor Howison, who occupies the chair founded by Mr. D. O. Mills. The department of English language and literature, first really put on its feet by the late Professor Sill, and then thoroughly organized by Professor Cook, (now of Yale), is also very important. The technical colleges have an excellent name, and their graduates have been successful professionally, especially those of the engineering course. The College of Agriculture, under Professor Hilgard, has now developed into a large and active center of agricultural investigation. It maintains experiment stations in different parts of the State, answers inquiries, oversees farmers' institutes, and is thoroughly appreciated now by the farmers, who formerly had the idea that it was intended as a sort of practice-school for farming, and should engage a farmer to teach boys to plow and prune.

Graduate degrees are given under conditions as strict as are required anywhere in America, and the graduate work is increasing yearly.

To the original six colleges have been

LIBRARY OF THE UNIVERSITY

added the Lick Astronomical Department, on Mount Hamilton, and the affiliated schools in San Francisco — the Hastings College of Law, and the Colleges of Medicine, Pharmacy, and Dentistry; University Extension courses, also, are now given in San Francisco, but the members of these are not enrolled as students. Of these allied departments, I shall hope to speak in a second article.

The students at Berkeley have a good record in general behavior, and there has been a remarkably small number of cases of serious discipline. This is half the work of the students themselves, for in the changing condition of the presidency they have been allowed to run their own affairs a good deal. The presence of young women, who now constitute over one third the number of students at Berkeley, has had much to do with this. There is no dormitory system, and many students live in Oakland and San Francisco. This has checked some branches of college athletics; but in track athletics the University boys hold the Coast championship. They have a good cinder track, and have been encouraged by the faculty in athletic sports, though not to the extent that prevails in the English and oldest American universities. They have an excellent gymnasium, the gift of Mr. A. K. P. Harmon, of Oakland, and excellent gymnasium instruction, which, with military drill, is compulsory for the young men; the gymnasium opportunities of the young women are not so good.

The grounds of the University, situated on the slope up to the Contra Costa hills, opposite San Francisco and the Golden Gate, have been worked over much, at great expense, and with small result. Mr. Olmsted's plan, drawn for the College of California, was declined by the regents, and various other plans have been tried and dropped. The water rights of the College, also, have somehow been in part lost, and the supply of water is insufficient. The natural beauty of the site, and the noble view, however, compensate for much. The buildings are most of them good, though none compare in beauty with the Leland Stanford, Jr., University, and there is no comprehensive plan among them; they are even of unpleasantly differing shades of brick. The affiliated schools being in San Francisco, the Observatory at Mount Hamilton, and the buildings at Berkeley scattered over a considerable tract of ground, they make a less display than those of most universities of equal importance. The library, of some fifty thousand volumes, is well housed and very convenient. This building was the gift of Mr. H. D. Bacon and the State in equal shares.

There are, of course, many buildings, many departments, many equipments, greatly needed. The income, though steady and increasing, is small for a great university, and will never be large enough to count among the first in the country, unless an era of large private endowments sets in. Harvard and Yale sometimes receive half a million dollars in gifts in a year. James Lick's gift of the Observatory, Judge Hastings' gift of the Law College, and Mrs. Hearst's of $100,000 in scholarships, are so far the only ones that have reached $100,000. One or two large private fortunes added to the State funds would make one of the greatest universities in existence — a truly magnificent end of the brave beginnings and early struggles.

Milicent W. Shinn.

THE UNIVERSITY OF CALIFORNIA. II. THE LICK ASTRONOMICAL DEPARTMENT.

I.

THE Lick Observatory is in a sense the crowning possession of the University. From the scholar's point of view it is eminent over the other departments in being the single one that is mainly given up to original research. From the popular point of view it is magnificent in the possession of the largest telescope on earth. It gratifies the pride of the State keenly to know that pilgrims from foreign lands count it one of the things that must be seen in California. No Philistine doubt of the utility of pure science can stand against this pride; and a public that has seen the time when it was half-ready to pull the courses at Berke ey to pieces in contempt of "unpractica learning," has never asked, "What practical use in knowing o a fifth moon of Jupiter, or a shadowy duplicate streak across Mars?" Doubtless the fascination of the heavens — of mystery, exploration, and discovery — has had much to do, also, with the interest in the Observatory; the diligence and skill with which its results have been made known to the people has counted for much; and none of the thousands who have visited the summit of Mount Hamilton can have failed to come away in some degree awed by the singularly visible form science takes on in that great dome in the heart of the wilderness, lifted up between the sky and the tumbled sea of mountain tops.

In spite of the pride in it at home, and its good name abroad, the Lick Observatory is not a rich institution. Mr. Lick's gift was $700,000. It was at first believed that $300,000 o this could be saved for endowment, but as the work of building and equipping on the mountain-top progressed it became evident that this would be impossible; and in fact, when all was done, the Observatory had cost about $600,000, leaving about $100,000 for endowment. The interest on this fund was supplemented by an appropriation from the general revenues of the University. This diversion of money from the main work of the University to a branch that had been expected to be dependent on its own revenues was not accomplished without opposition, but, I think, is generally aquiesced in now as necessary to any adequate use of the Observatory property. It is not, however, by any means a desirable way for the income of the Observatory to be permanently derived: there should be a separate endowment sufficient for all needs. Even with this help the full use of the resources of the Observatory cannot be had, for lack of a sufficient staff. The latest report gives the following comparison of the working force in several observatories: —

Lick Observatory	.....	6
Greenwich Observatory	.....	20
Harvard "	.....	40
Paris "	.....	17 astronomers, and many computers.
Pulkowa Observatory	.....	16
Rio Janeiro "	.....	16
Washington "	.....	19

Yet, the report adds, "at least as much is expected from the Lick Observatory as from any of these establishments."

The income of the Harvard College Observatory was stated by its latest report at $33,507 from funds, $64,958 from all sources. The average appropriations for salaries and current maintenance of the Washington Observa-

tory are stated at $56,000. The Lick Observatory received last year as interest on its funds, $5,100; from the University funds, $21,000.

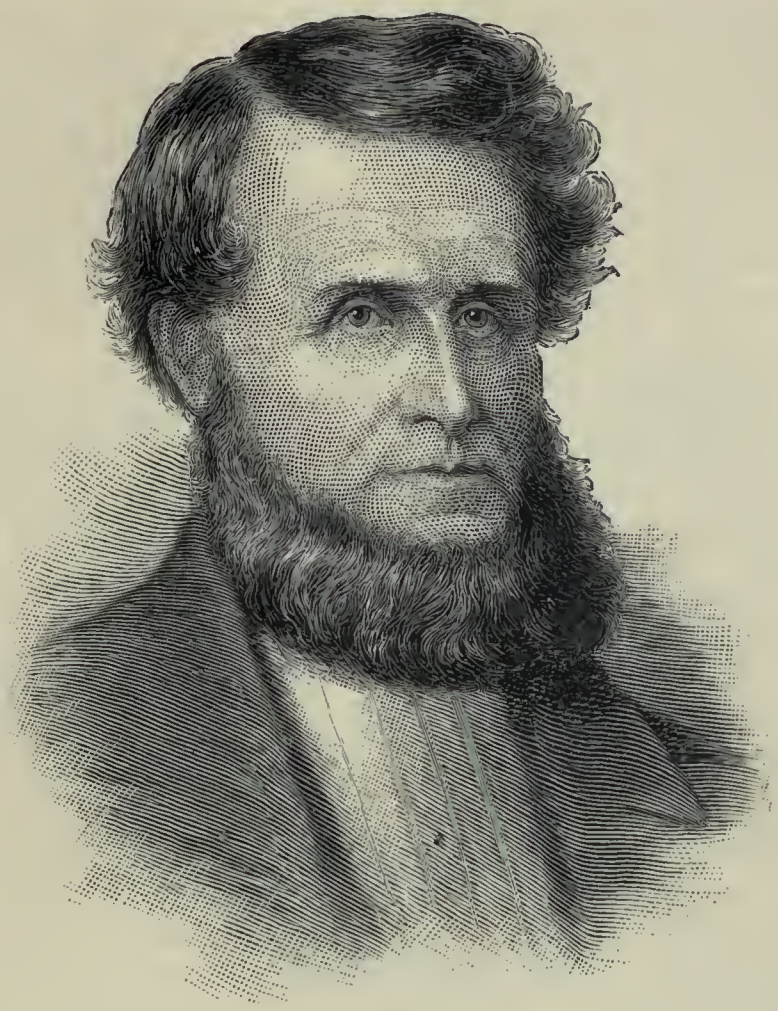
That it has under the circumstances held its own among the observatories of the world, as it has, seems to me a remarkable evidence of the diligence, precision, ability, and efficient adjustment of the work done by every one of the small group of astronomers. I find the Harvard Observatory and the Lick Observatory named together (in a pamphlet concerning the Washington Observatory, put forth by a number of American astronomers) as "the two chief observatories of America." In turning over the great foreign astronomical publications I find the Lick Observatory mentioned with constant respect; its observations texts for the discussions of learned societies and utilized in the work of the great observatories; its astronomers' names signed to frequent communications. Nor this by any means only in matters depending on "the mere brute power of a great telescope," (to plagiarize a clever phrase,) though of course the great telescope is its special distinction. I shall try to give later in this article some summary of the accomplishment of the Observatory so far, and I think it will be seen to be large in proportion to the means that have been available.

It is evident that the current expenses of the Observatory are all that its income could hope to cover. The sending out of a scientific expedition, the purchase of new expensive instruments, or any such outlay, can be accomplished only by means of gifts. And in fact a good deal of what has been done already has been due to the success of the director in interesting wealthy people in the work, and obtaining money for special purposes of this sort. In the four years of the existence of the Observatory nearly $10,000 has been thus given; and now Mrs. Phœbe Hearst has given a fund, which will yield at least $2,000 a year and will be in part applied to the maintenance of fellowships, thus increasing the staff to some extent; while it can be in part reserved for important special purposes.

II.

No one seems to know how or when the idea of a great telescope entered Mr. Lick's mind. It was there before he took any one into his confidence. He had never looked through a telescope; had never seen a real telescope, so far as any one knows. He was entirely ignorant of astronomy, and not even in an unlearned way an observer of the skies,— in early talks about his plans, for instance, he wished to be shown the moon in Professor Davidson's telescope out of his north windows. In some way, however, through chance readings, a sense of the glory of astronomical discovery had laid hold upon him, and the first persons with whom he talked of the disposition of his fortune found the plan of the telescope already firmly fixed in his mind.

James Lick was of "Pennsylvania Dutch" origin; he was brought up in the narrowest circumstances and with the narrowest intellectual opportunities; was in early manhood a mechanic in and near Pennsylvania, then spent most of his mature years in business in South America. He came to California in 1847 with a good deal of property, invested early in real estate, and at the age of seventy-seven found himself the owner of several millions, almost alone in the world, and failing in bodily powers; it was inevitable that he should ponder much on the disposition of his money. He had no belief whatever in personal immortality,— he was, in fact, a man of most marked disbeliefs in religious matters, recognizing Thomas Paine as his leader in thought,— but he had a great desire for that immortality in men's memories that follows the few



Engraved from Painting at the Lick Observatory.
JAMES LICK.

famous ones of earth, and he proposed so to dispose his millions as to win it. He did not at first altogether realize that in this aspiration he that saveth his life shall lose it; nor how impossible it is, in this stage of the world's progress, that a memorial should bring glory to a man's name unless at the same time it is of great service to mankind. His first will left as the main bequest a million dollars for statues of himself and his parents, to be erected on the heights overlooking the shores of the ocean and bay. Yet he was more than indifferent to having his portrait painted, and a passion for statuary for its own sake — abundantly shown in the minor bequests — probably entered into his desire to have his bodily presentment thus kept for all time.

In 1873 he began to take into his confidence a few acquaintances, and ask their judgment of his plans. Although he had lived a very isolated life, and had no near friends, he was in his way attached to the Pioneer Association and had made acquaintances there, and he had a liking for the Academy of Sciences and some sympathy with its pursuits.

In February, 1873, he quite unexpectedly offered the Academy a piece of land on Market Street, the site of its present building. Professor George Davidson, then president of the Academy, called to thank him, and Mr. Lick then told him of his purpose of leaving money for a great telescope. It could not have been far from this time that he spoke of his intentions to Mr. D. J. Staples, whom he knew through the Pioneer Association, and showed him his will. Mr. Staples became from that time one of his principal advisers in matters con-

cerning the trusts in general, as Professor Davidson was with regard to the telescope. There were others, however, with whom he talked, and it is quite impossible to trace the influences that finally shaped his benefactions; for he had a way of consulting one and another, and quietly comparing notes on their advice, without letting either one know what he was saying to the other; and in general I should judge that where their advice agreed, he took it; where it did not, he followed his own way.

Mr. Staples felt it his duty to tell Mr. Lick frankly that his bequests for statues of himself and his family would be utterly useless as a memorial; that the world would not be interested in them; and when Mr. Lick urged that such costly statues would be preserved for all time, as the statues of antiquity now remained the precious relics of a lost civilization, answered, almost at random, "More likely we shall get into a war with Russia or somebody, and they will come around here with warships and smash the statues to pieces in bombarding the city."

Mr. Lick was struck by this, and after a few moments' consideration asked, "What shall I do with the money then?"

Mr. Staples thought it too important a question to answer hastily, and after talking with Mr. Ralston, the banker, he brought together at Mr. Ralston's home a small group of careful men,—among whom were Mayor Selby, President Gilman, and Doctor Stillman, to consider it; out of this conference came most of the suggestions that Mr. Lick later adopted. There were points in the will that Mr. Lick's advisers felt sure would injure its validity, and he consented to draw a second will, and finally a deed of trust. These things, however, concern rather the story of the trusts in general than that of the telescope.

The first will had contained a bequest for this; and whatever other provisions were changed, this was never questioned by any one, nor changed except as, under the influence of Professor Davidson, the amount was increased. Mr. Lick had no knowledge whatever of any of the auxiliaries needed by a telescope, or of the purposes of astronomy beyond bare discovery; and all this was left to Professor Davidson to outline to him in the few months of their conferences. Out of the very interesting verbal narrative that Professor Davidson has given me of this episode, he is willing to have in print at present only so much as is contained in the following memorandum, which he wishes me to leave in his own words:—

I am not willing, at this time, to write the narrative of my relations with James Lick from February, 1873, to August, 1874, but I give very briefly the following items of interest:

James Lick originally intended to erect the Observatory at Fourth and Market streets. His ideas of what he wanted and what he should do were of the very vaguest character. It required months of careful approaches and the proper presentation of facts to change his views on location. He next had a notion of locating it on the mountains overlooking his mill-site, near Santa Clara, and thought it would be a Mecca,—but only in the sense of a show.

Gradually I guided his judgment to place it on a great elevation in the Sierra Nevadas, by placing before him the results of my experimental work at great elevations, as well as the experience of other high-altitude observers. At the same time, by my presentation of facts and figures of the cost and maintenance of other observatories, he named the sum of $1,200,000 in one of his wills, as the sum to be set aside for founding the James Lick Observatory, and for its support.

In making him acquainted with the size and performance of the telescopes of the larger observatories, I naturally mentioned the great reflector of Lord Rosse. That seemed to fire his ambition, and at the next interview he insisted on a refractor of six feet in diameter. It required long and patient explanations to get him down to forty inches, which was the diameter we finally adopted.

In October, 1873, I obtained his permission to make known to the California Academy of Sciences the main facts of his intention to place the largest refracting telescope that could be constructed at an elevation of 10,000 feet in the Sierra Nevadas. I have not the announcement within reach, but it was published in the *Alta California* late in October, I think the 21st. A short time before that I had con-

fidentially made the facts of Lick's intention known to Leland Stanford and his wife.

An eminent astronomer had nearly frustrated the whole project, by urging Mr. Lick to adopt a reflecting telescope instead of a refractor; but he had a remarkably clear mechanical mind, and I had very little trouble in satisfying him of the weakness of the suggestion.

Before I went to Washington for consultation with other observers for the Transit of Venus expeditions of 1874, Mr. Lick held to the decision of the refractor at a great elevation, and details had been decided upon, although he had several times changed his will in other matters. Before departing I showed him that by the Code of California he could not then devise by will to any corporate body, and urged him to make a Deed of Trust.

Upon my return I found he had made the Deed of Trust, and that some of the Pioneers had prevailed upon him to locate the observatory on the north shore of Lake Tahoe; and had prevailed upon him to reduce the $1,200,000 to $700,000.

When he again changed his views, and determined to locate the observatory on the vastly inferior site of Mount Hamilton, I declined further conference with him.

The whole of my intercourse with him was full of curious and interesting, and sometimes dramatic, incidents, that have never been sought by any one professing to write the history of the Lick Observatory.

Photo by H. E. Mathews.

AN OCEAN OF FOG BELOW MT. HAMILTON, LOOKING NORTH.

The trust deed was dated July, 1874; for over a year and a half Mr. Lick had been continuously occupied in consultations and plans as to the exact disposal of the money. He now began to occupy himself with the carrying out of his favorite purpose, the erection of the telescope. The deed did not bind him positively to the Tahoe site, and his mind lingered about nearer ones, for he had from the first been reluctant to have

Photo by H. E. Mathews.

THE OBSERVATORY FROM THE EAST.

the observatory so far from routes of travel; he wished it to be as much visited, as constantly before the eyes of people, as possible. He found advisers who favored various nearer sites,—chiefly on the ground of the severity of the winters at Tahoe; and during the summer of 1875 he had his agent, Mr. Fraser, examine and report on a number of these sites, Mount Hamilton among them. Mr. Lick had been a citizen of Santa Clara County until 1873, and had property there, and when Mr. Fraser reported that Mount Hamilton was the most accessible and the most convenient for building, and when the county agreed to construct a road to the summit, he decided finally to place the Observatory there.

It is something over 4,200 feet high, and as it was the first great astronomical establishment to be placed at any considerable height, it was talked of all over the scientific world for this, as well as for the great telescope. An article in the *Edinburgh Review* gives Mr. Lick great credit for having "felt instinctively," though without astronomical knowledge, what the astronomers were just coming to perceive,— that the great need of their science was high altitude observations; and for having been "from the first determined" upon taking the pioneer step in this direction. In fact, it had taken a great deal of pressure, not from Professor Davidson only, for Mr. Staples and doubtless others said much to him on this point, to prevent the location of the Observatory between Pioneer Hall and the Academy of Sciences Building, under the fogs of the peninsula, and amid the

jarring of drays. Professor Davidson, however, had set his heart upon so much more — an elevation of not less than 9,000 feet — that he could not reconcile himself to what he felt the loss of an unprecedented scientific opportunity. And in fact the Lick Observatory may soon be surpassed in its advantage of altitude by others, as it is already by several observing stations. I do not know that it follows that it will be surpassed in the excellence of its "seeing," for I find that astronomers do not agree as to the supreme value of high observing stations; for stellar observations, it is said, rarity of air is not so important as steadiness, which does not necessarily depend on height; at medium heights, also, the freedom from fogs on the one hand, storms on the other, may be expected to be greatest, and the number of clear nights in the year the highest. These are points, however, for astronomers to settle. Certainly Mount Hamilton has been praised over and over as the best site in the world so far occupied by any great observatory. Professor Burnham's visit in 1879, while it was still a wilderness, his sojourn on the mountain in a temporary dome, and his enthusiastic report on the conditions, are within every one's memory. In the three fall months of his stay forty-two nights were "first-class," — a higher proportion perhaps than at any other time of year; but observers in Wash-

Photo by Taber.

THE ROAD TO MT. HAMILTON.

ington have been known to have but thirty-eight very good nights in a year.

While Mr. Lick was settling the question of the site, the trustees began to consider that of plans. They consulted Professor Newcomb, of the United States Naval Observatory at Washington, and during the October of 1874 he and Professor Holden, at that time one of the astronomers of the Washington Observatory, drew the general plans that have since been followed. At the same time, Professor Holden was asked by D. O. Mills, the president of the trustees, to take the directorship of the observatory, and accepted. The whole work of building and equipment was of a sort to require supervision from an astronomer, besides an amount of personal attention which it was hardly possible for Mr. Mills to give. Professor Holden was a young man for such a place,— twenty-eight years old,— but he was a man of whom a great deal was expected, energetic and brilliant, and of good training. He had been a year one of the astronomers in the Washington Observatory and Professor of Mathematics in the Navy, before that for two years a lieutenant in the Engineer Corps and instructor at West Point, where he had graduated with distinction, after taking a scientific degree at the Washington University of St. Louis. But he was not destined to enter upon the duties of director till many years later; for in 1875, some dissatisfaction having arisen between Mr. Lick and certain of his trustees, he sought to recall and remake the trust deed, succeeded in doing so through the legal services of Mr. Felton, and in September, 1875, made a new trust deed, in which he reserved the right to change the trustees. The only other change made by this deed was, that the observatory was to be turned over ulti mately to the University instead of the Academy of Sciences. I have been told of a personal incident that Mr. Lick gave as a reason for this change; it is not unlikely that Mr. Felton's influence also, which was always for the University, had something to do with it.

Under the new deed Mr. Lick appointed a board, of which Captain Floyd was the president; and a year later replaced it by a third, retaining Captain Floyd as president, however. A month later, October 1, 1876, Mr. Lick died, at the age of eighty. He had ended after all by leaving no provision for his own tomb; but he is said to have spoken of wishing to be buried at the Observatory; and in 1887 his remains were carried to the mountain and placed in a mausoleum, under the pier of the great telescope.

In the same year, 1876, Captain Floyd being in London met Professor Holden, who had been sent by the government to examine and report upon the South Kensington Loan Collection of Scientific Instruments, especially improvements in astronomic and geodetic instruments. This acquaintance resulted in Professor Holden's becoming the scientific adviser of the board through the whole process of construction; he completed the specifications for the buildings according to the original plan, took part in the vast correspondence that was carried on with astronomers and opticians all over the world, and later attended to the purchase of most of the instruments. For three years nothing but planning and correspondence could be done, for the trust was kept at a standstill by the danger of a litigation that might have ended in the loss of the whole. Claims were, however, happily compromised, and in 1880 work was begun on the mountain.

To place buildings so substantial and extensive on a bare peak twenty-six miles by mountain road from the nearest town, was, of course, no slight undertaking. Seventy-two tons of rock had to be removed to get a level space large enough for the building, and two sum-

Meyer, in *Himmel und Erde*

LICK OBSERVATORY IN WINTER.

EDWARD S. HOLDEN.

mers were consumed in this task. Santa Clara County had promptly and efficiently fulfilled its promise, and one of the finest of mountain roads,— firm, even, and so beautifully graded that there is not a place in it where the stage-horses need break their trot,— awaited the beginning of work on the Observatory. In five years all the buildings were ready, except the great dome, which had to wait till the telescope was ready.

Mr. Lick's deed had provided for "a telescope superior to and more powerful than any telescope yet made, with all the machinery appertaining thereto, and appropriately connected therewith, . . . and also a suitable observatory." When these words were written, the largest refracting telescope in the world was the 26-inch one of the Naval Observatory, made by Alvan Clark & Sons, and erected in 1873. But while the Lick trusts were at a standstill three more large glasses were made, the largest one 30 inches, made by the Clarks for the Imperial Observatory at Pulkowa, Russia. 36 inches was the largest lens the Lick trustees could get the Clarks to contract for ; so at that size the order was given, $50,000 being the contract price. Every one will remember the somewhat dramatic story of this glass : how Feil & Co. of Paris, undertook to cast it for the Clarks, and sent the flint-glass over safely in 1882, but cracked the crown-glass in packing ; how the elder Feil having retired, the sons tried in vain for a couple of years to get the great glass block safely cast, and at last went into bankruptcy ; how the elder Feil came to the rescue, took charge of the business again, and near the end of 1885 shipped to the Clarks a perfect block. Professor Newcomb, who visited Europe to investigate this matter of glass disks, made an interesting report on the process of making, which I have seen quoted. The difficulty is to get the glass of perfectly even texture throughout, and this can never be hoped for on the first annealing ; veins must be cut out, the block reheated, pressed together, and again annealed, each trial consuming months.

J. M. SCHÆBERLE.

E. E. BARNARD.

The Clarks then took a year for the "figuring," — the delicately precise shaping of the lenses to the most perfect collection of light, so delicate that the last stages are done with the thumb and palm of the hand.

The mounting was made by Messrs. Warner and Swazey, of Cleveland, and the great dome by the Union Iron Works of San Francisco. Of the mechanical excellences of the work much has been said in many journals; and although some adjustments were necessary before everything worked smoothly, I believe the work has all proved to be on the whole wonderfully perfect and wise. The great telescope, with its accessories, cost about $200,000.

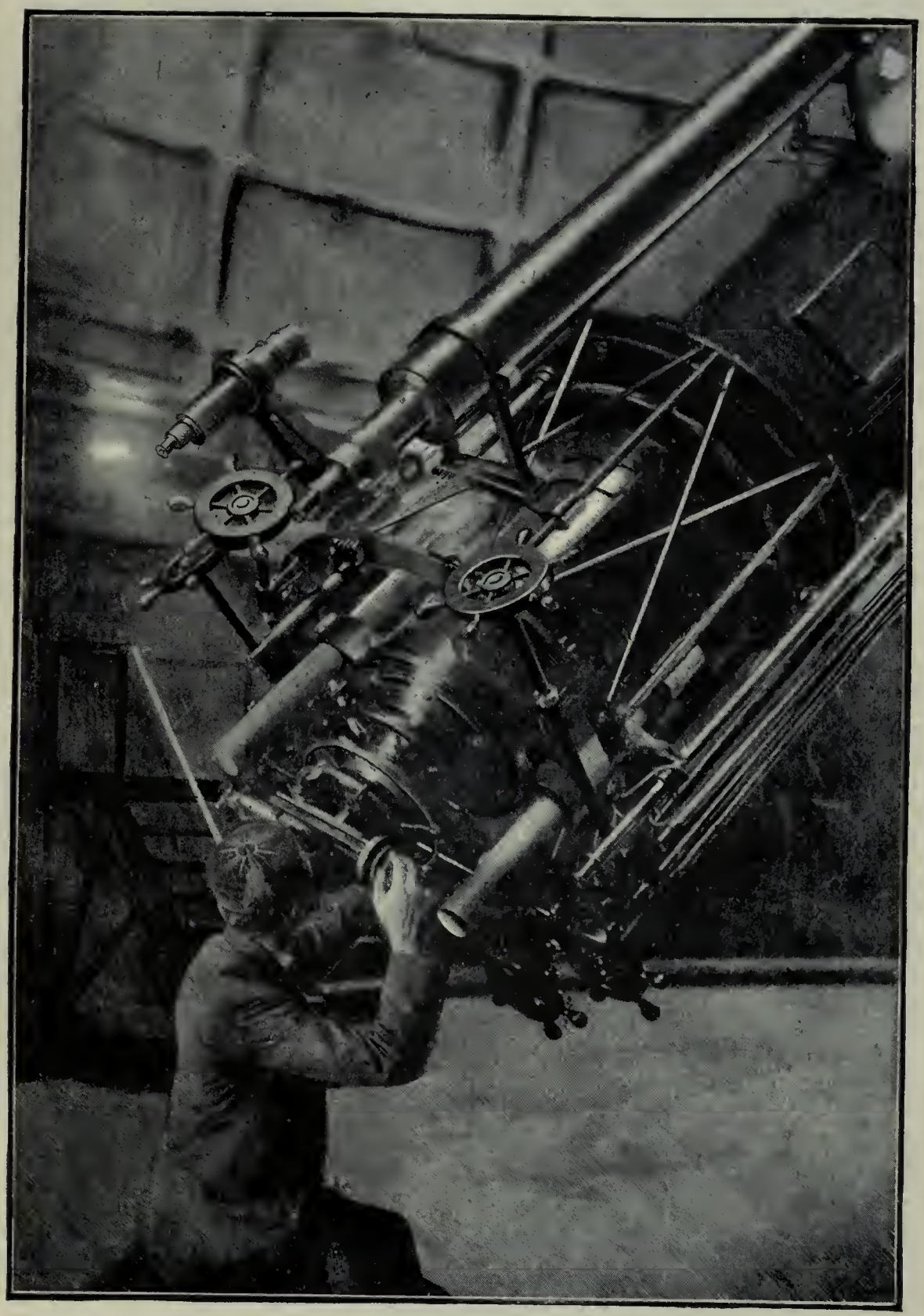
Professor Holden made three visits in 1881, to attend to the setting up of the meridian circle, and observe the transit of Mercury; and in 1882, Professor Todd, of Amherst Observatory, observed the transit of Venus here, and obtained excellent results. In 1885 Professor Holden came to the State as president of the University and director of the Observatory, and for the next three years made vacation headquarters at the mountain, and was able to be in constant communication with the trustees in San Francisco.

In 1888 the Observatory was formally turned over to the University regents, and its staff of astronomers was appointed. Professor Holden, as a matter of course, was retained as director; he had been called to the University with that understanding. The fourteen years that had passed since his relation to the Observatory began, had been so occupied as to give him in unusual degree an "all-round" acquaintance with the practical and theoretic questions of his science. He had remained five years in the Washington Observatory, and had been successively in partial charge of each department of astronomical work, and in each had been employed not only in observing, but in calculating and in the study of results; and had made as librarian, bibliographer, and writer, an unusual aquaintance with the literature of

W. W. CAMPBELL.

the science. He had in 1881 been called to the directorship of the still unfinished Washburn Observatory, at Madison, Wisconsin, and had organized it efficiently : d given it a good standing. In 1878 he had been in charge of the United States Eclipse Expedition to Central City, Colorado ; in 1883 of the United States Eclipse Expedition to the South Pacific Ocean ; and in 1884 of the Division of Meteorology of the Northern Transcontinental Survey. Without having attained brilliant distinction in any one department of his science, he was an astronomer of recognized merit in all, as evidenced then or soon after by honorary degrees from several universities, and membership in a long list of scientific societies in America and Europe ; one of these at least, that of associate membership in the Royal Astronomical Society of England, an honor enjoyed by scarcely a dozen American astronomers, and a practical guarantee of standing. "The first requisite for the director of a great observatory" (I quote a private letter from an astronomer) "is to have a very clear notion of just what kind of work ought to be done, how it should be done, and then to give all the aid in his power to the investigator. In all these particulars Professor Holden seems to be just the right man in the right place." In carrying on the external relations of the Observatory, also,— relating it to other observatories, in this country and abroad, seeing to it that knowledge of its work is thoroughly and to the best advantage disseminated,— Professor Holden has been a successful director ; aided in this by a really fine literary power and a wide general cultivation. Of difficulties just now discussed by the papers, concerning the adjustment of internal relations, I do not think it suitable to say anything here. It is unfortunate that any one should have tried to adjust them through the press : Mr. Alvan Clark might as well have tried to figure the great lens with a Corliss engine. This much should be said : whatever difficulties have occurred have been aggravated first by the want of a permanent president in the University, which raises questions of authority, and second by the inherent difficulties of settling novel questions of administration in a novel situation. This is the first great, permanent observatory thrown so on its own resources, far from university or city surroundings, and without the relief of contact with other than the one line of thought. Nor is the situation of a remote military post analogous, for definite military precedents there settle everything,— a system impossible in a branch of a modern university, manned by scientific men, of independent thought and distinction.

The appointment of his colleagues was left to Professor Holden. He selected J. E. Keeler, now director of the observatory at Alleghany, Pennsylvania, S. W. Burnham, E. E. Barnard, and J. M. Schaeberle. Besides these, the only full astronomers, holding rank as professors in the University, have been Henry Crew, now of Northwestern University, and W. W. Campbell, appointed last year. Of those astronomers who are not now on the staff, I must not pause to speak, except in the case of Professor Burnham, who has been connected with the Observatory until very lately. His somewhat unique position among American astronomers deserves mention. He is not only one of the self-created men of science who have not been so very rare in America (the story has been told in print and is not unfamiliar), but he is an instance in what I think must be a rare degree of the attainment of eminence through concentration of effort on a single line. Professor Burnham is not only a specialist in being an observer merely, unfamiliar with the other sides of astronomical science, but as an observer he is almost exclusively a specialist in double stars ;



EYE END OF THE GREAT EQUATORIAL. PROFESSOR KEELER.

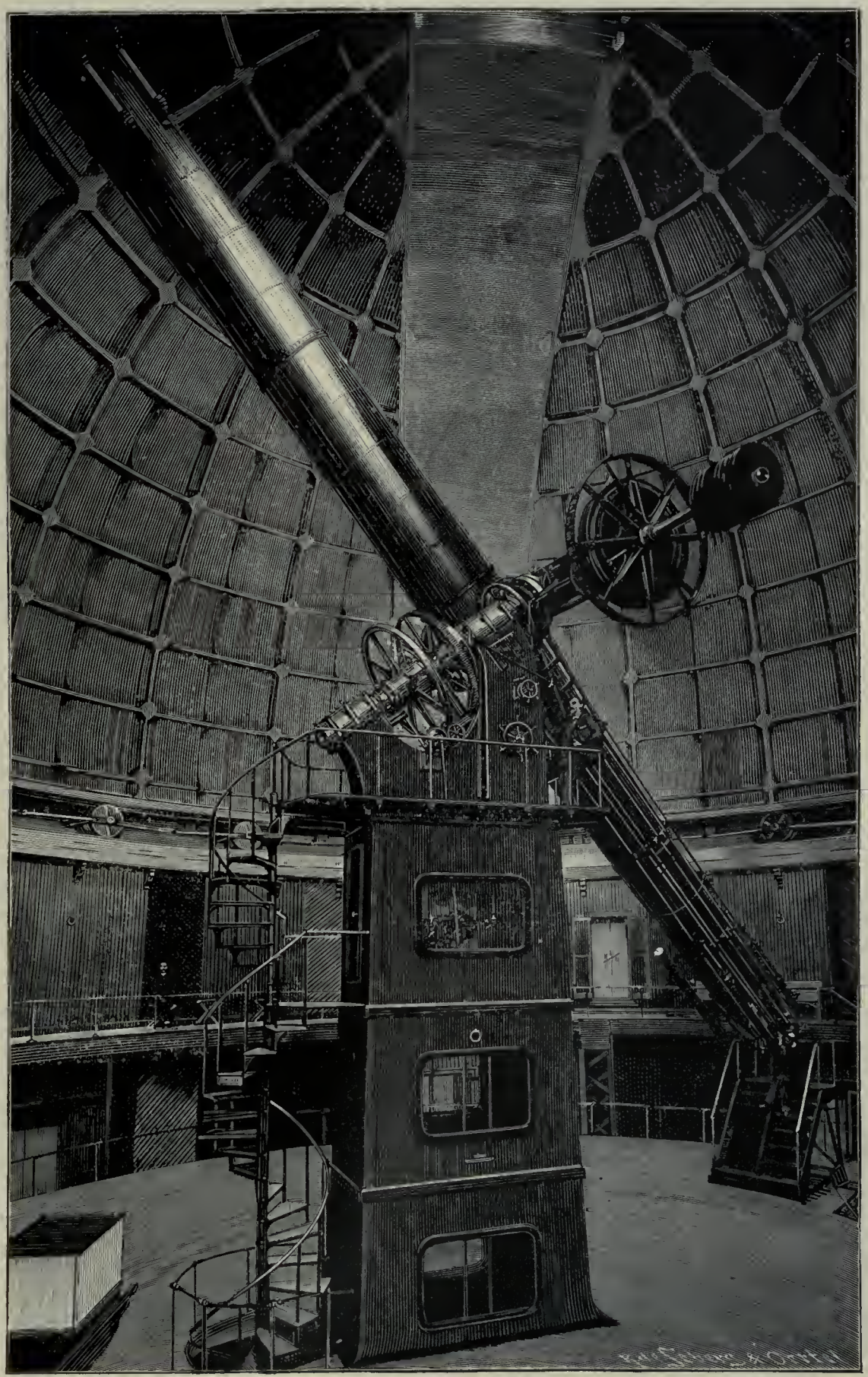
and in discovering and measuring these he has no rival. While he was at Mount Hamilton, this branch of observation naturally became very prominent, and the great telescope was given up to it for more than a third of the time.

Professor Barnard also is a self-taught astronomer, and while not a specialist in so intense a sense as Professor Burnham, he is primarily an observer. His keen vision, great power of eager and yet patient and laborious attention, and doubtless other elements in his work that astronomers could define, give him in especial the name of "genius" among his colleagues. Just now the most brilliant and generally interesting feat the great glass has yet accomplished, the discovery of the fifth moon of Jupiter, has brought Professor Barnard the more into note. Before this, however, he had made some remarkable observations on comets, following them to unprecedented distances and detecting their approach before any one else. In 1891 he discovered all the five comets of the year, including two new ones; in all, he has discovered nineteen comets in ten years. Besides these most striking observations, "Professor Barnard has made a very large number" (I quote a newspaper account by Professor Holden) "upon the physical appearance of the planets Venus, Jupiter, and Saturn, upon the zodiacal light, etc., upon meteors, lunar eclipses, double stars, occultations of stars, etc., and he has discovered a considerable number of new nebulæ also."

Professor Schaeberle is an astronomer of full university preparation, trained thoroughly and soundly on all sides of his science, and in those allied sciences that university preparation includes. A graduate of Michigan University in 1876, he was instructor in practical astronomy in the observatory there, refusing calls elsewhere, till he came to Mount Hamilton in 1888. He has discovered two comets, made long series of meridian circle observations and very extensive calculations concerning asteroid and comet orbits, and has done much work in physical and mathematical astronomy. His theory of the causes of the sun's corona was the text of a recent discussion in the Royal Astronomical Society of England, and if finally accepted will be to those who value the interpretation of the universe more than the collection of its facts, the most solid and important contribution to science yet made by the Observatory. Professor Schaeberle has just put forth tentatively a theory which seems to account for the "canals" of Mars and their duplication with a rational simplicity: if we regard the bright portions of the planet as water, and the dark as land, instead of *vice versa* as at present, he points out, the "canals" may not improbably be mountain chains, some of them parallel chains, as on the earth.

Professor Campbell has been in the observatory only a year, but has forwarded its work much by introducing the photography of spectra with the great telescope. He has also studied the orbits of comets, and published last year a text book of astronomy for university use, which, I am told, has been well received. He is a Michigan University graduate of 1886; was professor of mathematics in the University of Colorado, then succeeded Professor Schaeberle as instructor in astronomy at Michigan University.

The present distribution of work among these astronomers is given by the official report as follows: The great telescope is used for photography two nights in the week, by Holden and Colton (assistant astronomer and secretary); two for spectroscope observations by Campbell and Townley (Hearst Fellow); two by Barnard and Schaeberle for miscellaneous observations; Saturday night is given up to visitors. The 12-inch telescope, the 6½-inch telescope, the comet-seeker and photographic tel-



Meyer from *Himmel und Erde*, Berlin.

THE GREAT EQUATORIAL.

escope, are used by Barnard, and by others when not in use by him. The meridian circle is in charge of Professor Schaeberle; the time service, of Professor Campbell, but most of the work is done by Mr. Townley. The meteorological and earthquake instruments are in charge of Mr. Colton. Professor Holden, besides the general charge of the establishment and of forwarding each one's work, the work in photography, and until Mr. Townley was appointed as the first Hearst Fellow, in spectroscopy, has most of the work of librarian, the scientific correspondence, and the editorial charge of the publications of the Astronomical Society.

The Observatory, as turned over to the University, had a site of 1901½ acres, since increased to 2581½ acres; this is mainly made up of State and national grants, for most of the mountain-top was fortunately public land. One object in getting so large a reservation was to guard against brush fires, by which the buildings at one time were threatened. The main building consists of two domes, connected by a hall 121 feet long, along the west side of which are study and work rooms. The great dome, 78 feet in diameter, occupies the south end of the leveled platform; it moves on the top of a tower, whose foundations are set deep in the rock. The moving parts weigh nearly 89 tons, but so perfect is the mechanism — operated by a small water-engine — that one may see the vast concave swing around at the pressure of a child s hand. The floor works up and down by a hydraulic arrangement devised by Sir Howard Grubb; this arrangement to a great extent takes the place of an observer's chair. The monster tube, fifty-seven feet long, and four feet in diameter at the center, is mounted here on an iron pier thirty-eight feet high. It is provided with "finders" of six, four, and three inches in diameter. When it is used for photography, an additional single lens, 33 inches in diameter, is placed in front of the two lenses that form the visual objective, and the instrument is turned into a great camera. The eye end is provided with mechanism by which the observer as he sits can do most of the handling necessary; with a micrometer, and a frame to which spectroscopes, photometers, or enlarging cameras, can be attached. The Observatory has besides the great equatorial a 12-inch one, which occupies the 25-foot dome at the north end of the platform, a 6½-inch one, and a 4-inch "comet-seeker." Behind the main building is the meridian circle house, which contains a fine Repsold meridian circle and a 4-inch transit and zenith telescope. The Observatory is besides well equipped with spectroscopes, chronographs, clocks, meteorological instruments, and complete earthquake apparatus. These buildings, with a small photographic laboratory, take up the leveled space. On the side of the peak a large brick dwelling-house for astronomers finds place, reached by a bridge to its upper story; and below, on the saddle between two peaks (the mountain has three), gathers quite a village of subsidiary cottages, workshops, etc. Beyond these is a small dome for photographic work, the gift, with its telescope, of Regent C. F. Crocker.

When the late Mr. Newall, of England, presented his 25-inch refractor to Cambridge, his son, who was to be its astronomer, made a tour of the great observatories of the world, and came all the way to California to study the equipment of the Lick Observatory and the mounting of the great telescope. The Earl of Rosse visited and examined it in 1891; Professor Auwers, of the Royal Academy of Sciences of Berlin, and Professor Vogel, Director of the Potsdam Observatory, are to do so soon, on a tour of inspection with reference to a great telescope for the Prussian government. The satisfaction the astronomers feel in showing the Observatory and its

VENDELINUS.

From Drawings twenty-fold enlarged from the Negative made at the Lick Observatory, August 31, 1890, at 14 h. 27 m., P. S. T., by Professor L. Weinek Director of the Observatory of Prague.

equipment to these competent judges is unmistakable. It certainly seems, even to the guest ignorant of astronomy and astronomical instruments, a most intelligible satisfaction. The whole place is fascinating, exceedingly, — the road thither, winding up from one stage to another of mountain outlook, through the amazing medley of loops and turns by which it preserves its easy grade, mounting at last and circling the sides of the peak itself ; the fine, firm, dignified building, before whose broad entrance one is finally set down ; the shining orderliness and perfection of everything ; the sense of being islanded above the world, the distance and seclusion, and yet the intimate nearness to the whole world of science ; the cordial hospitality of every one there ; the vast, dark dome by night,—"as big," some one with me said, "as the sky looks to most people,"—with the great tube spanning the darkness, directed steadily and silently against the sky, like a powerful cannon, lying in wait to storm its immemorial secrets.

III.

Mr. Lick's deed prescribed that the Observatory should be "made useful in promoting science." Whether through the alliance with the University or by Professor Holden's original plan, it has taken on also a function of diffusing knowledge and aiding education in the State. I do not know if any other great observatory in the world takes on itself any such function, at least to any such extent. In the first place, there is the surrendering of one night in the week to visitors. This does not mean that a few stray pilgrims make their way to the shrine in the wilderness. It means that stage after stage from San José rolls up,—twenty in a procession, sometimes,— and the little group of astronomers receives with unflinching courtesy the hundreds of passengers, and with a system and deftness that is really wonderful marshals them through the Observatory, explaining patiently its leading points, until far on in the night. 22,496 guests are recorded in four years, —some of them by day, to be sure, when the Observatory is always open. No other observatory in the world offers such privileges to visitors. The Astronomical Society of the Pacific is an efficient means of diffusing astronomical interest and knowledge. It seems to be an unusually vigorous and well-knit organization, publishes a bi-monthly journal, skillfully edited to be of interest to astronomers and unlearned members alike, has branches in Eastern States, and some five hundred members scattered all over the world. And in addition, through newspapers and magazines, full explanations of the work and statements of the general results reached in the Observatory have been given forth as fast as they reached definable shape. No one that knows much of the time and skill such publication demands can look over the quantity that has been done without wonder and respect.

The Observatory has from the first planned for graduate students whenever the accommodations permitted, and nine in all have studied practical astronomy there ; of these, five were professors from other institutions, who came for further study of some special sort. It is the intention to make more and more of this graduate work, and already no student need leave California to get the highest training in astronomy. The Harvard and Washington observatories give no instruction, and there is no reason why the California University graduate school should not become the source to which observatories all over the country will look for their young astronomers. The director has been unusually diligent and successful — as any one may learn by an examination of the reports, periodicals, and other sources of first-hand information available — in bringing for-

MARE CRISIUM.

From Drawing by Professor L. Weinek from the Negative taken at the Lick Observatory on August 23, 1888.

ward the younger men about him and making their successes known; and I am told by competent and disinterested authority that the system of giving credit to individual observers in announcing the results of the Observatory work is very liberal at Mount Hamilton, as compared with that of other observatories. The really promising young astronomers from the graduate school will profit by this system.

What has the Lick Observatory done thus far for "the promotion of science?" It is a question that a mere onlooker

cannot possibly answer except by a resummary of the summaries already put forth, and confirmed by the notices of astronomical periodicals: —

Solar Eclipses of Jan. and Dec., 1889. —At the January eclipse Professor Barnard, and the Amateur Photographic Association, more or less under his direction, took many fine photographs of the corona, which demonstrated the existence of an "extension" of the outer corona. The eclipse of December was observed by Professors Burnham and Schaeberle, who went to South America at the expense of Regent C. F. Crocker. The photographs of these two eclipses are recognized as among the best photographs of the corona ever made. Two books have been published by the Observatory containing the results of these two eclipses.

It was from their evidence that Professor Schaeberle was led to his theory of the corona, mentioned above. In April, 1893, the next total eclipse of the sun takes place; this theory, by which, if it is sound, the general features of the future corona can be *now* foretold, will then have a practical test. A party under Professor Schaeberle will go to Chile, to observe the eclipse.

Observations of the Planets and Satellites.—The planets have been steadily watched and studied, measures and drawings of them made, and enlarged photographs of Jupiter taken at regular intervals, thus recording all changes in the surface. These photographs, taken by Professors Holden and Campbell, are the subject of a paper before the Royal Astronomical Society, by A. Stanley Williams, who praises them all highly, and says of one that it is perhaps the finest and most interesting photograph of Jupiter ever obtained. Much time has been spent in examining the planets Mars, Uranus, and Neptune, in search of new satellites. Jupiter has been disadvantageously situated, but is now coming steadily into better position, and will be more and more studied: last summer Professors Schaeberle and Campbell made some interesting discoveries as to the forms and motions of the moons; and in September came Professor Barnard's famous discovery of the small inner moon.

Double Stars.— In this department the Lick Observatory has easily led thus far, and Professor Burnham catalogued 198 new double stars there. His resignation will make the subject less prominent in future work.

Meridian Observations.—These series of observations, carried on by Professor Schaeberle with the meridian circle, are first to determine the positions of stars to join together the systems used in the nautical almanacs of the different nations; second, to determine the *refraction* of the stars. A former series of similar observations is being reduced by computers in the East, at the expense of Miss Bruce of New York, and Professor Mendenhall of the United States Coast Survey.

Absorption of Photographic Rays.— Professor Schaeberle, from observations by Professor Campbell and himself, has determined the amount of this absorption by the air at different altitudes,— a datum necessary in fixing the photographic magnitudes of stars, and never before definitely determined. This memoir is about to be published by the University in book form.

Comets.— Professor Barnard's notable observations, which give the Lick Observatory the lead in this direction, have been mentioned above.

Star-Clusters and Nebulæ have been regularly studied and photographed, and in the case of the cluster in Hercules a novel peculiarity of structure has been ascertained. Professor Barnard has taken some important photographs, showing the real shapes of nebulæ. Professor Holden's paper on Helical Nebulæ has been translated into German, and received with much consideration.

ARCHIMEDES, AUGUST 15, 1888.

ARCHIMEDES, AUGUST 27, 1888.

From Drawings by Professor Weinek, enlarged ten times from negatives made at the Lick Observatory in August, 1888.

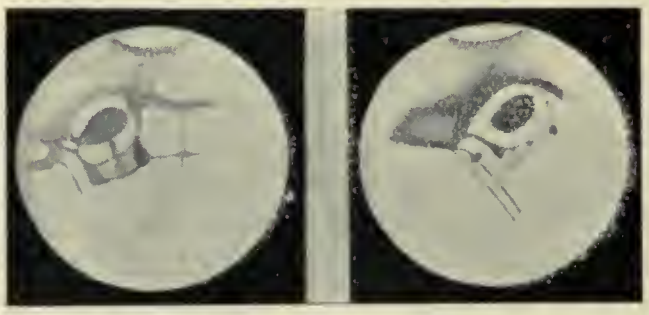
Moon Photographs are regularly taken with the great telescope, and it is the intent to continue till a complete set has been obtained for every hour or so of the moon's age. Changes on the moon's surface can thus be detected. These photographs have been mechanically enlarged on glass by Professors Burnham and Barnard, and they are now sent regularly to Prague, to Professor Weinek, who makes enlarged drawings of parts of the surface, which are printed in heliogravure, at the expense of Walter Law, of New York. These drawings are studied by Professor Weinek and Professor Holden with great care, and Professor Weinek has discovered many new features in this way. Doctor Otto Boedicker, astronomer of Lord Rosse's observatory, Doctor Ebert of Erlangen, and Doctor Franz of Koenigsberg, are also making special studies of them.

Milky Way.— The Milky Way also is to be studied by means of photographs, which Professor Barnard is now taking, attention having been directed to the promise of excellent results through some most successful ones that he had made. The comet lately discovered made its impression on one of these plates, and was thus first recognized as a stranger.

Spectroscopy.— Professor Keeler made some remarkable spectroscopic observations, by which he established (for the first time) the motions of nebulæ in the line of sight. When Professor Campbell succeeded to the work, he adapted the spectroscope — intended for visual observations — to photographing spectra, and the results showed enormous advantages in this method. To this is largely due the unrivaled success of the Lick Observatory in studying the new star in Auriga. The greatest number of lines in its spectrum reported from other observations is three ; Professor Campbell has measured fourteen. During the time this star was very faint, the photographic observations of the Lick Observatory were the only ones by which it could be followed. They alone showed its neb-

ular character, and since its extraordinary change into a true nebula, they have been the only ones that kept account of its motions — showing that it has been moving away from us, and is now approaching, probably revolving in a vast orbit — and of its nature, indicating that planetary nebulæ owe their genesis to such new stars; both most important steps in our knowledge of stars.

A review of the publications of the Astronomical Society will show many minor or subsidiary inquiries going on at the Observatory. The secretary's report to the regents shows that from June, 1888, to September, 1892, there have been 462 papers published by the astronomers and students—more than two a week. Some of these have been brief scientific memoranda; many of them long and arduous papers.



1892, Aug., 14 d., 11 h., 15 m. P. S. T. W. W. Campbell.

1892, Aug., 17 d., 11 h., 15 m. P. S. T. W. J. Hussey.

SKETCHES OF MARS SHOWING CANALS.

Two things will be noticed in looking through this summary of the scientific work. First, the great importance of the photographic method. This is a new aid to astronomy, which the Lick Observatory has been one of the first to appreciate, and which it has unrivaled facilities for using. The power it gives to *record* a fleeting phenomenon, to sit down and study it at leisure, and to send it for confirmation to another observer, even the other side of the world, makes it of inestimable value. Second, the co-operative relation with other observatories. It has not been the general policy of observatories to give out their results promptly, and help each other in making use of them. The Lick Observatory, by a division of labor that to some extent makes it a gatherer of raw material, to be worked up in places where more help is available, has been of service to these other observatories, received great service from them, and hastened the advance of science, a few months sufficing to have thoroughly studied, interpreted, discussed, and settled, some point that might have had to wait years, had each observatory depended on its own resources. As has been said, if the four distinguished foreign astronomers now engaged in special studies of the moon negatives were on the staff of the Lick Observatory, they could hardly utilize its advantages and help its work more.

In addition to all the purely scientific work, the Observatory regulates the time service for the Pacific States, sending out daily signals to all the railroad stations; and several minor services of the sort have been rendered.

That the Lick Astronomical Department has done a surprising quantity of work in the four years, cannot be questioned. One is disposed to think after reviewing it, that too much has been done rather than too little. The great ambition of all the astronomers to force the Lick Observatory instantly into the world's front rank, in spite of limited means and small staff, by a quantity of work that would demand attention, and of such sort as would bear the judgment of the first European scholars and societies,—this seems to me to have kept the work at a high pressure that has told somewhat on the men. We must be grateful, however, that the grade of the work has been kept high. It is most easy and tempting in a new institution to make concessions from an excellence that one's public will never miss; and all the evidence shows that the Lick Observatory has not done this.

Milicent W. Shinn.

THE UNIVERSITY OF CALIFORNIA. III.

I.

The Professional Schools.

The relation of professional schools to the American university system is somewhat anomalous. They seem to form a group standing to one side, with a different admission standard, and a different series of degrees, whose relation in value to the regular university degrees is not clear. It is a university theory, and also the best tradition of the "learned professions," that the degree marking the entrance to these should be equivalent in value to the Ph. D., as it is on the continent of Europe: that is, that a college education should precede the study of law, medicine, or divinity, and the schools devoted to these studies should be graduate schools. On the other hand, the organized bodies of lawyers, doctors, and clergymen who control admission to their professions, have to reckon with a public sentiment in this country that favors letting any one try any calling in which he thinks he can find customers. The result is a compromise, by which a certain amount of special training is required — and except in the case of the clergy usually enforced by law — for admission to the practice of the profession; and the schools as a matter of course give this minimum of training, while the best ones try to give something more. The Hastings College of the Law, the law school of the State University, finds that about twice as many candidates are admitted to the bar by the Supreme Court examinations as by the degree of the school; and one of its professors has published the statement that those students who fail in its first year examinations are generally thus admitted shortly after. The medical school has similar experience. As for general education, no formal requirement is made for admission to the practice of any profession; and has not been until lately in professional schools. Now, the medical school of the University requires as preliminary to its courses a schooling a little in advance of what would admit to a high school, and recommends more; the dental school exacts about the same; the school of pharmacy still less; the law school requires a full university matriculation,

THE LATE JOHN NORTON POMEROY,
HASTINGS COLLEGE OF THE LAW.

LIBRARY OF THE UNIVERSITY

such as would admit to the colleges at Berkeley.

The courses in the medical, dental, and pharmaceutical schools, therefore, tend rather to range themselves parallel with high school than with university work.

JUDGE CHARLES W. SLACK,
HASTINGS COLLEGE OF THE LAW.

In the law school, the student, entering on a full matriculation, is really in the same relation to the University as a special student who should take three years' full time at Berkeley in some single topic,— engineering, say. The engineer would not be given a degree for this work; a four years' course, in which the special work must be rounded out by a liberal amount of general training — literature, history, language, science — is required, before the university will give him its stamp. Yet there is scarcely a professional school in the country that requires as much general education as the Hastings College. The Harvard law school calls for considerably less.

The medical school of the University was organized with the provision that its standard of admission and courses of study should be as high as in the medical schools of Harvard and the University of Pennsylvania; but this has been construed to mean as high as the standard of these schools at that date, and is not quite equal to that of Harvard at present, nor to that of the University of Michigan. I have not compared with other leading schools, but I am satisfied that none in the country at present requires very much more. There is a spirit, however, felt through all the medical profession in this country, in favor of raising the standard of medical schools in general education. There is a national organization of college-bred physicians, which exercises a good influence in this direction. The Johns Hopkins University medical school is to be placed on a strictly graduate plane, and a college education or its equivalent will be expected of its students. The medical school of the University of California shares in this spirit, and holds before it as an immediate desire the exaction of two years in general study at Berkeley as requisite to admission; but while it has no revenue except its fees, and there is another good medical school in San Francisco to which students will be likely to turn instead of rising to meet more difficult terms of admission, it seems to the faculty impossible to take any very long upward step. When the law school raised its standard of admission, the numbers fell off by half, although there is no other law school in the State to turn to; but as the school is endowed, and charges no fees for instruction, it can afford to disregard the question of numbers, as the medical school cannot.

The dental school was the third in the United States to require an entrance examination at all, or a three-year course.

It will be seen that while the professional schools of the University fall in general education far short of the European standard, they only share the disadvantage of professional schools through-

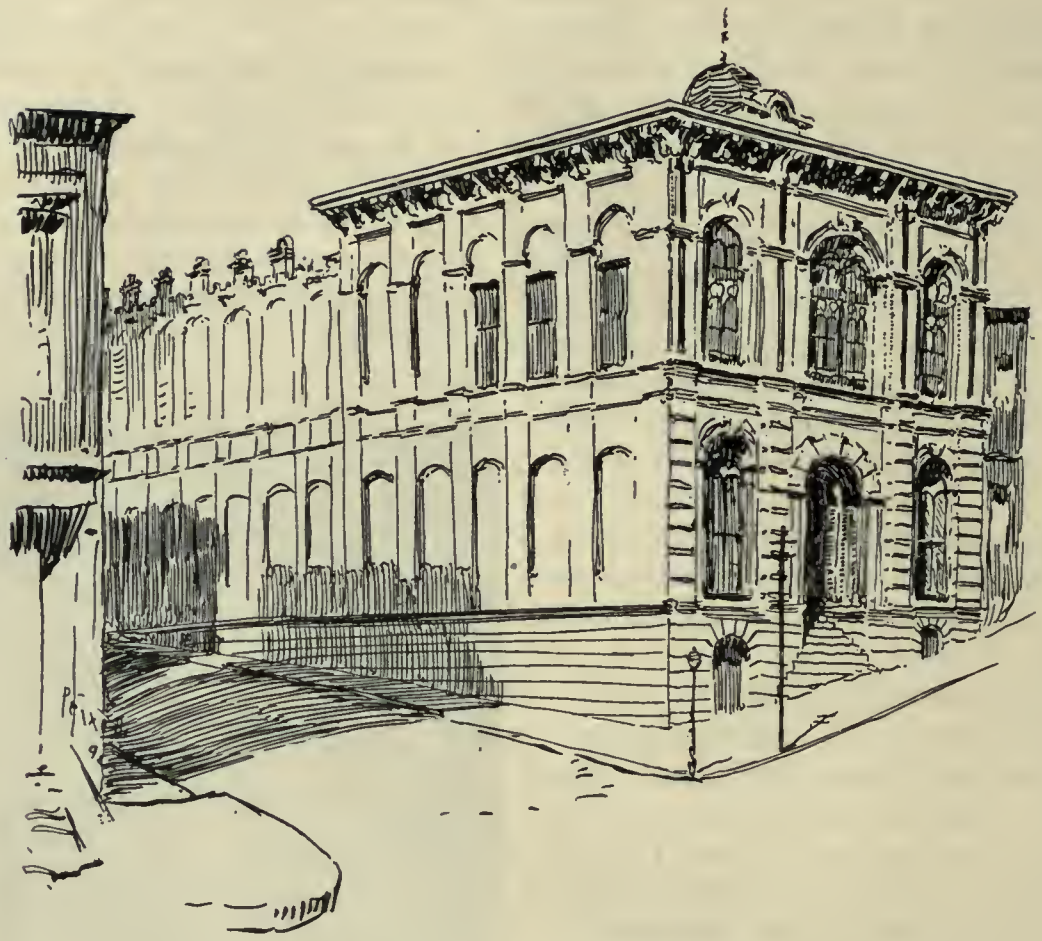
out this country. In their professional specialties, as far as they go, I know no reason to doubt that they rank well with the foreign. Students from the medical school of this University are given full credit for the time spent in it, at the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons at Glasgow. Of course, for more advanced medical study, Americans at present feel it necessary to go abroad ; but physicians who went from this school to the great school of Paris have told me they found the foundations of their education well and thoroughly laid here, and have always thought the three years wisely spent.

Again, the actual condition of professional education throughout this country is kept much higher than the legal requirements, or even the requirements of the schools, by the excellent traditions of the three leading professions, whose moral influence is sufficient to make many students voluntarily seek a college education before the professional. Thus the Hastings College of Law, though requiring only a high school education before entrance, had among 96 students last year 39 with collegiate degrees. The medical school, while requiring scarcely more than a grammar school education, had among 89 students, 11 with collegiate degrees. This brings about classes composed of youths from the grammar schools, from the high schools, and college-trained men, to whom identical courses must somehow be adapted ; but the anomaly is a little softened by the age limit of eighteen years imposed in all the schools.

In spite of the difficulty of assimilating them to the rest of the system, law and medical schools are regarded as essential parts of a full university scheme, and divinity schools would be, but for difficulties arising from their sectarian character. They represent branches of learning too important to be ignored by an institution whose business is with "all the great departments of intellectual life." Medical schools carry along with them such departments as dental and veterinary surgery, and pharmacy ; schools of all which are attached to one or another of the leading universities.

R. BEVERLY COLE,
ACTING PRESIDENT OF THE MEDICAL FACULTY.

There is now a tendency to regard art schools as properly adjuncts of a university, and several of the strongest universities have affiliated or incorporated such departments. No one can say exactly where the list ends of special schools that may properly be associated with a university ; but nothing marks low standards more surely than a large and various fringe of outlying departments. Probably the rule instinctively observed by the best univer-



TOLAND HALL, MEDICAL DEPARTMENT.

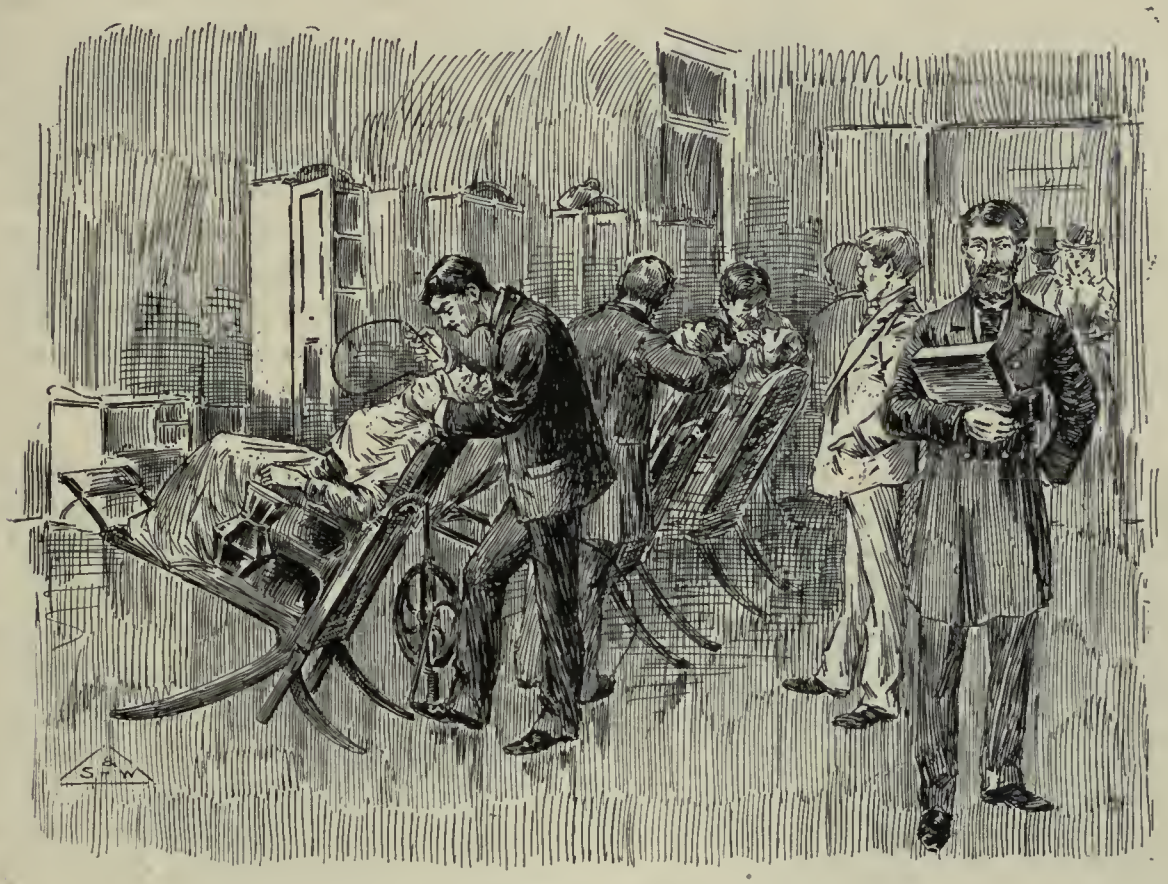
ROBERT A. MCLEAN,
DEAN OF THE MEDICAL DEPARTMENT.

sities is that — now technical education is definitively accepted as university work — any professional training that involves serious and continued study, and rests on a basis of theoretic knowledge, may be given by a university.

The University of California has four professional schools,— the Medical Department, commonly known as the "Toland College of Medicine," though this is not its legal name; the College of Dentistry, organized as a branch of the Medical Department, but now practically independent; the Hastings College of the Law, an affiliated college; and the California College of Pharmacy, also affiliated. It is practically settled that the California School of Design will soon be affiliated. The law school had last year a faculty of 4, and 96 students; the medical, 28 professors, lect-

urers, assistants, etc., and 89 students; the dental, a staff of 33, and 98 students; the pharmaceutical, a staff of 9, and 144 students. The professional faculties do not give full time to their school work, as at Berkeley, but only such hours as may be spared from their calling. In the College of Pharmacy two evenings in the week constitute the course. All these schools — if we regard the College of Dentistry not as a separate school, but an outgrowth of the medical — were schools depend upon their fees,— $315 for the three-year course in the medical school, and $65 for a year's graduate course; $380 covers all fees for the three-year course in the dental school; the College of Pharmacy charges fees according to courses, but they average about $160 for the two-year course. The medical and pharmaceutical schools own their buildings.

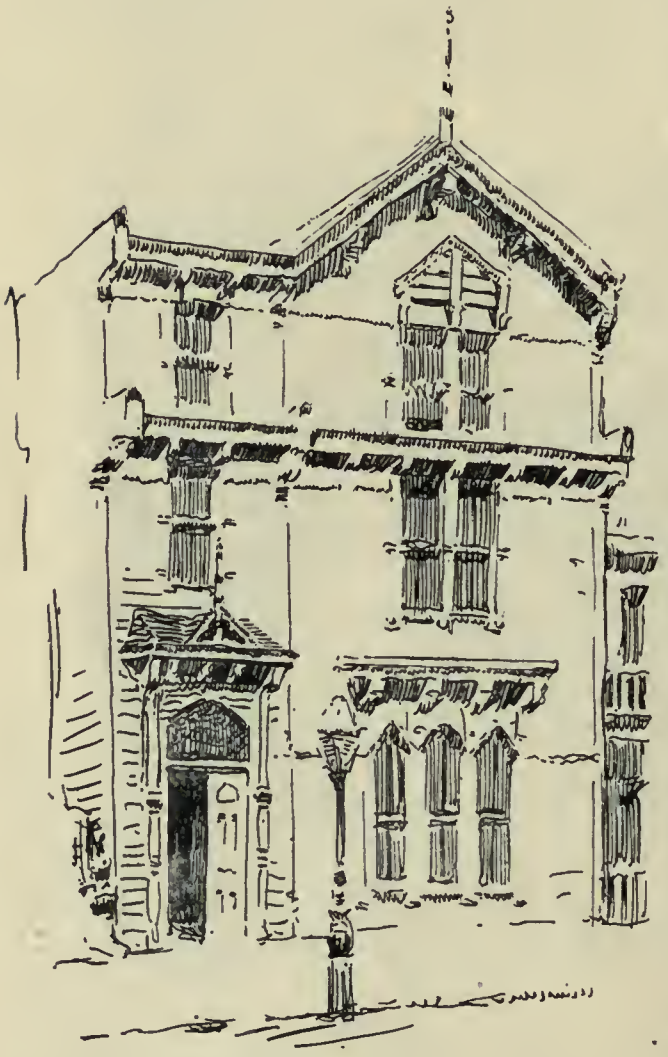
The medical school was founded by the gift of its building, by Dr. H. H. To-



A DENTAL CLINIC.

first separately founded, under their own trustees, and afterwards joined to the University. None of them receive any support from the University funds. The law school, as mentioned above, has its own endowment,— $100,000 paid by Judge S. C. Hastings into the State Treasury, under the provisions of a special act by which the State agreed to pay annually seven per cent upon this sum for the maintenance of the school. The other professional land, in 1869, just after the founding of the University. Doctor Toland appointed his own board of trustees, of which John B. Felton, a regent of the University, was president, and his own faculty, including himself, Dr. L. C. Lane, Dr. Henry Gibbons, Sr., and other leading physicians. An effort was made almost at once to transfer the school to the University, with the cordial approval of faculty and trustees; but difficulties arose concerning the terms, and Doctor

Toland withdrew his gift. The faculty then resigned, and one of them, Doctor Lane, afterward became patron of another school, now the Cooper. In 1873, Doctor Toland renewed the gift of the building, and organized a new faculty with Doctor R. Beverly Cole at the head; and through the influence of Doctor Cole and of President Gilman



COLLEGE OF PHARMACY.

the school was again offered to the University, this time as an unconditional gift, and was accepted, and made the Medical Department of the University.

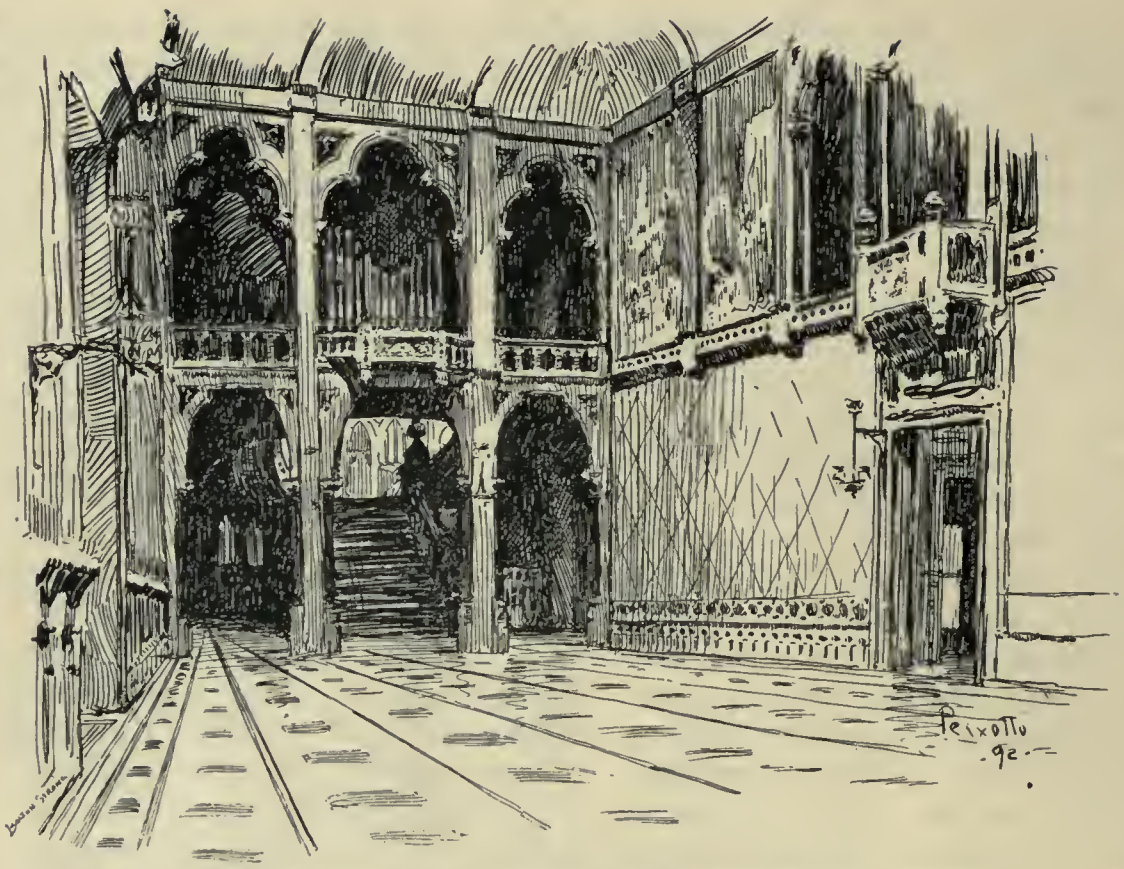
The organic act of the University required the establishment of colleges of Medicine and Law whenever the state of funds permitted, and put these on the same footing as the colleges at Berkeley. It also provided for the acceptance of these or other colleges, by gift as integral parts of the University, or by affiliation. Affiliated colleges, retaining their own boards of control and managing all their own affairs, are naturally expected to provide their own funds, and there is now a distinct provision to the effect that they shall do so, and shall be permitted in lieu of support from the University to charge fees at their discretion. The medical school was not affiliated, however, but incorporated as an integral part of the University; and as the regents did not feel that the time had arrived when the funds would carry a medical school, it was made a special agreement that the school should receive no money from the University, but should be permitted to charge fees. This has placed it practically in much the position of an affiliated school, and the regents, while they really have the same control over its faculty and its work as over the colleges at Berkeley, have refrained from using it, leaving the faculty entirely independent. The feeling within the medical school is that the time has come when it should be treated altogether as an organic part of the University, and receive its share of the revenues. The regents have postponed this completion of its organization, feeling unable to divert so large a sum from the growing needs of the departments already fully organized and on their hands, and hoping that the evident merit and importance of the medical school would attract special endowments. If the two medical schools in the State could be consolidated, it would not only release both from the need of any rivalry for fees, holding down the standards of admission, but would also increase the probability of endowments, and double the force of the claim — which cannot justly long be ignored in any case — upon the University funds.

In 1881, the faculty of the Medical

Department petitioned the regents to establish, as a branch thereof, a Dental Department, offering rooms in its building for that purpose. The history of this petition was as follows :— Since about 1870, there had been a State Dental Association, whose object was to obtain legal regulation of the dental profession ; a dental school was felt to be necessary before the entrance to the profession could be guarded by law, and the Association had a standing committee on the subject. There were at that time only about half a dozen dental schools in the country. One of the members of the Association, Doctor Cogswell, gave a building to the University for the establishment of a dental college, and one was nominally organized, but never put into operation ; the building was not such as could be used for the purpose, and the gift was so hampered by restrictions against selling or mortgaging that it was finally returned by the regents to the donor, and the Dental College given up. The whole matter stirred up afresh the zeal of the Association, and Doctor S. W. Dennis, with some other members, asked the Medical Department to let them have lecture room and clinical facilities in Toland Hall. From this request grew the petition of the medical faculty. It was granted, and the Dental Department established as a branch of the Medical. In 1885 the desired law was obtained, forbidding the practice of dental surgery without a license obtained on examination, as in other branches of the medical profession. In 1891, having outgrown its quarters in Toland Hall, the school removed to separate rooms, and practically severed its connection with the medical school.

The Medical Department has just accomplished an affiliation with the San Francisco Polyclinic, which supplies an optional fourth year in its course, after

THE HOPKINS-SEARLES MANSION.



MAIN HALL IN THE HOPKINS-SEARLES MANSION.

the degree. The Polyclinic is primarily a charity, incorporated in 1889 by a group of San Francisco physicians, with Dr. J. H. Stallard as president, for the purpose of giving free daily clinics to the poor, and is supported by funds raised by a board of Lady Patronesses. It is attended by forty-one physicians, and had last year 20,881 visitors. Its trustees had long wished to turn to account, for purposes of instruction, the great amount of material at hand, thinking that a purely clinical course, open only to those already graduates in medicine. would be most beneficial to the standards of the profession here. An attempt had been made to organize such a course, but it had failed to obtain students. On the other hand, the University medical school wished to have a graduate year, making its course really four years, though it did not feel able to require more than three as a condition of the degree. Accordingly, an affiliation was made in May, 1891, according to which the Polyclinic retains its own management and its character as a charity, while conducting at the same time the graduate course of the Medical Department of the University. The course is open to all who hold regular medical degrees, but those who hold them from the University are asked but one third of the fees. Among its advantages will be a complete apparatus for bacteriological study, the gift of R. H. McDonald, now on its way from Berlin. Hitherto there have been no facilities of the sort on the Coast. The undergraduate course also includes clinical instruction, for which there is exceptional chance in the fact that many of the teaching staff are also on the staff of the City and County Hospital; the school has charge of several wards there, and four graduates every year have the privilege of appointment as internes. In this very important matter of clinical teaching a small school of good character has a real advantage over the great schools; the student may see close at hand every

operation, and learn much by actual handling; while in the great schools he must often see from a distance,— even through opera glasses, I am told.

Immediately after the Medical Department was organized, in 1873, President Gilman suggested the affiliation of a school of pharmacy which had been started the year before by the California Pharmaceutical Society, then just incorporated. The course in the College of Pharmacy is accepted as equivalent to a year's work in the Medical Department, where seven of its graduates are enrolled by the latest register.

The Hastings College of the Law was founded in 1878, expressly to belong to the University, although its founder, Judge Hastings, preferred to put it under separate trustees, and make the separate arrangement for its funds mentioned above. I do not know that there is any good end to be gained by this arm's-length sort of connection which would not be better gained by a full union; but in this case the presence of so many of the University graduates in the law school makes the connection in feeling close. It was the effort of the trustees of this school to exclude from it two women, on the ground of their sex, that brought about the Supreme Court decision which fixed the status of affiliated schools as parts of the University. It is to the effect that all regulations of the University not expressly excepted in the articles of affiliation are binding upon affiliated schools. In accordance with this decision two or three women have graduated from the law school, and one is now studying there.

A home law school is felt by the California bar to be especially important, because law learned elsewhere does not prepare for practice under the California constitution and codes, and the school has always been looked on with a good deal of interest and consideration; though one of its professors speaks of a "stupid opposition" formerly felt, for fear it would overcrowd the profession. Its graduates have ranked well, although all are still young; five are on the Superior bench (all of these regular University graduates also), and several have been district attorneys.

The circumstances of the contemplated affiliation of the School of Design are fresh in every one's mind. Mr. Searles had offered to the school the famous Hopkins-Searles mansion in San Francisco, the bequest of his wife, formerly Mrs. Hopkins. The house cost perhaps half a million, and though the costly furniture has been removed, is remarkable for the opulence of its inside finishings, carving, panelings, and tapestries. The School of Design did not feel able to accept a gift that would cost so much in taxes and repairs and bring no income, and it was accordingly offered to the University on condition of the affiliation of the school. The offer was accepted, and the deeds have gone for signature to Mr. Searles, who is now abroad.

The School of Design was founded in 1873 by the San Francisco Art Association, which was itself founded two years earlier by a group of artists and newspaper men. Colonel Avery, at one time editor of the OVERLAND, and Noah Brooks, one of its earliest contributors, were in this group; J. B. Wandesforde was first president of the Association, and Virgil Williams director of the school from its foundation till his death. There are now five teachers, Arthur F. Mathews at the head. The school has been entirely dependent on its fees and the membership dues of the Association, and has no important property except a fine set of antique casts, the gift of the French government, through Pietro Mezzara, then a leading sculptor of California. That it has given, in spite of meager facilities, a thorough elementary training seems evident from the good standing its graduates have taken in Paris and elsewhere. By the proposed

terms of affiliation it will keep its board of directors and the entire management of its funds and its course of study; the regents are to give certificates upon recommendation of the faculty. The school is to have such occupancy of the building as it needs for purposes of fine art. It covets the stable as its headquarters, on account of the north light; the lower floor will be especially adapted to modeling, also. An art museum, occupying one floor of the mansion itself, is also talked of, but the school does not yet possess the contents for such a museum. The regents, on their part, expect also to use the building as headquarters for Extension lectures, and for their own meetings.

II.

THE ACCREDITING SYSTEM, AND EXTENSION WORK.

In its relation to the public school system the University of California is becoming especially strong, — stronger than any other great university except that of Michigan, whose method it has followed in the main. The University of Michigan was founded as part of a comprehensive plan of State education, embracing everything, from lowest to highest, as in the Prussian system, by which it was inspired. The definite connection between high school and university was not supplied, however, until 1870, when a sort of voluntary and unofficial relation, corresponding to the official one between the German gymnasia and universities, was established in the "diploma system."

The essence of this system is the admission of graduates from certain accredited schools, upon their diplomas, without examination. It is not exactly promotion from high school to university, as from one grade to another in the same school; but it is in effect a good deal the same thing, only under such safeguards as surround no other promotion in the whole school system. The system has been adopted in Illinois, and attempted, in imperfect form and without much success, by Cornell, Amherst, and Williams. The "Regents' Examination" in New York is a system somewhat akin. The Stanford University accepts high school certificates at its discretion, but has no regular accrediting system. In California it has had an independent development, not following strictly that of Michigan; nor does it owe its origin altogether to Michigan. For ten years before it was adopted, there was talk in the University of bringing about a better co-operation with the high schools, and efforts were made through conference with the high school teachers to influence and help the preparatory work. During that decade, however, the high schools were by the new constitution cut out from the State public school system, and were experiencing a period of great discouragement. Nothing was really accomplished till the end of 1883; a plan of accrediting was then decided on that closely followed that of Michigan, — whether actually taken from it, or from the same German sources, no one seems to remember clearly; probably from both, and from the obvious demand of the local situation as well. It was formally adopted by faculty and regents in the spring of 1884.

The substance of the system is as follows: — The University notifies all preparatory schools that such as request it will be visited and examined on the quality of teaching by a committee from the University, and if found satisfactory will be granted the privilege of entering its graduates without examination. The visiting and examining of the school is in some ways more thorough here than anywhere else. In the first place, instead of sending one examiner, to look into the merits of the school in a general way, the University — as soon as a request has been received for examina-

tion, and it has been shown by schedules of studies and sample examination papers forwarded that the school is really trying to cover the ground of University preparation — sends from time to time representatives of all departments, who remain it may be a whole day listening to the instruction, perhaps taking a class, examining records and papers, conferring with teachers, principal, and trustees, and in every way getting the fullest attainable idea of the status of the school, each one as to his own department. Upon bringing together the reports of these various visitors it is determined whether the school may be accredited or not. Nowhere else in the country is any such searching examination given the school: a committee of one, or at most of two, visits and reports; or, perhaps, at need some competent person unconnected with the University is authorized to examine. Moreover, in California the accredited status must be renewed annually; in Michigan it lasts for three years, unless some material change in the course of studies or teaching corps of the school takes place. This greater vigilance in California, however, may not mean any real superiority in thoroughness, for in Michigan the University deals with strong schools of established standards, manned largely by its own graduates; here, the work is largely of building up and setting standards.

The examination is by no means a mere form, and schools have been rejected more than once or twice. Since 1888–89 a school may be accredited, however, for one only of the four different matriculation examinations by which different courses in the University are entered. Usually they prepare for three, — which means that the high school does not afford teaching in Greek, and consequently cannot prepare for the classical course. Of 31 schools this year, 11 only are fully accredited; 6 prepare for but two courses; the rest for all but the classical. Since 1891, a school may be accredited in one or more subjects, though failing to offer any whole course satisfactorily; 14 of the 31 schools are accredited in this limited way. When the school is examined subject by subject, and teacher by teacher, as it is, it gives no more trouble to the University to accredit in this partial way, beyond a little more book-keeping; and it serves as a strong stimulus to the deficient departments to pull up to the level of the others.

Besides the diploma of an accredited school, a candidate must bring a special recommendation from the principal in order to be exempt from examination. The conditions of recommendation to the University are understood to be more severe than those of graduation even from the best schools. Nor are principals likely to become lax in giving these recommendations, for the renewal of the accrediting depends not only upon the annual examination, but also, and as much, upon the record made in the University by the recommended graduates of the previous year. In one case a school lost its accredited rank through careless recommendations given by the principal. Still farther to lessen the danger of a point's being strained to recommend a boy who deserves it in most respects but not in all, a principal is permitted since last year to recommend with exceptions, and the candidate is required to pass examination on the excepted study only.

Thus there has grown up a complete system of inspection, examination, and report upon the schools throughout the State, more guarded, and yet more flexible and stimulating to the schools, than exists in any other State. Out of it has grown a supplementary system of visiting, — even where the formal examination is not asked, — with advice and suggestion. This has come spontaneously into existence in the last three years, as an outcome of the cordiality of relation

the schools have come to hold toward the University, and the growing sense of dependence on its advice, and desire for its verdict as to their work. The University not only stands ready to visit and advise in the organization of a high school, or the possibility of bringing one to accredited grade in future, but makes it now its business to take the initiative in a systematic attempt to have knowledge of all the secondary schools of the State, to make direct acquaintance with all as opportunity offers, and to keep up a living relation between the university and high school stage of education. It was this visiting system that President Eliot, after examining its workings on his recent visit to California, adopted for the use of Harvard.

In all this there is no assumption of authority, for it is purely voluntary. But in a spontaneous way, and by mutual consent, it supplies in a considerable degree that supervision of the schools from the universities, instead of from the public that Matthew Arnold says (in a very important article in the *Century Magazine*,) makes the lower schools of the Continent *alive* to the bottom, where those of America and England are dead. Its effect on the schools has been wonderful. Three were fully accredited the first year, 11 this year, besides 20 partly accredited. In 1888 the privilege was extended to private schools, and seven of these are on the list, leaving 24 free high schools preparing fully or in part for college, where 8 years ago scarcely half a dozen made any attempt These numbers are small by those of the "approved" schools of Michigan,— 54, besides 37 in neighboring States, over which the Michigan University now extends the privilege; but the system has been in operation almost twenty-two years there, nearly three times as long as in California, and I judge that even before 1870 secondary education had been better cared for in Michigan than here, where it has been the Cinderella of the school system.

The University test has supplied the schools a standard which they could not possibly have had in any other way, and the accrediting is earnestly sought, and teachers are sifted and changed with reference to it. It is not that the exemption from examination is so great a thing to obtain, for the boy or girl that deserves the exemption does not need to fear the examination; but that the accrediting fixes the status and merit of the school. Principals who know they are doing good work wish it attested to their trustees, and trustees suspect something wrong when neighboring schools obtain the guarantee and their own does not seek it. To lose this certificate of what may be called standard high school rank, once gained, is a serious matter, and an instance has been known in which a great city high school reorganized its force rather than meet such a discredit. Even political influence weakens in its power to uphold an incompetent teacher in face of it, for severe popular disapproval might be provoked by the loss of standing for the school. The University has nothing to say anywhere on the choice of teachers: it simply reports on the quality of the teaching when asked; and now that so many schools are accredited, it is impossible for the authorities of any prominent one to avoid asking.

As an instance of the value attached this report, it was related to me that to when, some years ago, the school board of a small inland city was surprised by the University examiners with the information that its little high school was the best on their list, and published the news with some elation, the examiners promptly received appeals and complaints from the large schools; and the little school was soon stripped of all its three teachers,—two called to larger positions, one to opportunities for further study,— an unfortunate result for the

school itself, but in the line of the general advancement of education. In another case, a community was grudgingly supporting, by vote of a small majority, a new school, and by no means certain to maintain its thoroughly competent principal against a local favorite who wished the place. The school had not yet the advanced classes that would justify a request for accrediting, but some of its friends asked the University to send a representative to visit and report on it on general principles. The University cordially responded to this, and to a later request for a speaker on a public day connected with the school; and the community, surprised and pleased to find the unpretending little institution many of them had thought scarcely worth fostering valued and praised by wise men from afar, gave in the next election their hearty support to school and principal, and shouldered cheerfully a considerable tax for a schoolhouse.

In other cases, perhaps in many at the beginning, the visiting committees have doubtless met much antagonism and distrust toward the University; but it has always disappeared on acquaintance with the real character and work of the institution. Ten years ago it was no recommendation to school boards that a candidate held the University degree, and college graduates were not expected to make up the staff of a high school to any extent,—at least, not college women. The regular path to high school positions in the cities was by promotion on account of success in grammar school work. Now, each year finds University graduates more and more sought, for high school positions especially.

Besides the use to teachers and community, these visits from the University and the sense of connection with it have an incalculable effect on the pupils. At that age a mere glimpse of something higher and beyond, of a possible attainment unthought of before, sometimes changes a life. President Angell says that this impulse given to the high schools goes down through all the lower grades, and imparts an aspiration and energy to the whole school system. The university, too, he points out, is bettered, not only by receiving more and better students, but also by being kept in touch with a large region of sociology that universities sometimes neglect.

A second means of alliance with the schools is the appointment of a professor of pedagogics,—whose special topic is school education. The University has been somewhat late in this, though such a department was remotely planned for here almost as soon as one existed anywhere in the country. In Eastern universities the pedagogical work concerns itself mainly with the scientific study of the subject; but in State universities a good deal of active relation with the lower schools is added to it. In the University of California this new department does not lessen the work of the visiting and examining committees, but supplements it. The professor of pedagogics is often sought as a speaker at teachers' institutes; and as there are fifty-three of these annually in California a really heavy demand is likely to be made on him among them. His regular business in the University is with professional instruction,—not Normal School training, but still instruction looking directly to the preparation of the student for the work of a teacher or superintendent of education. This is properly graduate work. If the student takes part of his undergraduate course to prepare himself for the work of a teacher, it robs him of that much time for the general education he will never have an uninterrupted chance to get again in his life. Just as much as a man or woman who desires to take the highest rank as a physician plans to give three years to professional work

after completing his college course, one who really appreciates the demands of the schoolroom should plan for a special training on as high a level. In no other way can the long-talked-of "elevation of teaching to the rank of a profession" take place. It is a cherished hope, also, of students of common school education, to see school superintendencies, State, and county, and city, come to be regarded as callings peculiarly belonging to special students of educational affairs, and properly to be looked forward to by young men of ability when they seek advanced graduate training in the subject. If three years of graduate work, is hardly to be hoped for as a preliminary to a profession of so small emoluments, one year at least, might be urged on graduates who look to high school teaching Meanwhile, the University authorities have judged it best to give instruction on common school education among undergraduate studies; and certainly some knowledge of the subject belongs to what every educated person should know.

Still another link between the two grades of education is in the special Teachers' Courses that have for years been growing into more and more importance at Berkeley, until now Saturday is largely given up to them, and considerable bodies of teachers from the neighboring cities and villages come in to one or another lecture or seminary, especially adapted for their uses. Some of this work is pedagogical in its nature, professors in one and another department giving instruction on the method of elementary teaching, each in his specialty; oftener they are the regular undergraduate work, so arranged that it can be followed in weekly classes. Some of the evening sessions of literary, scientific, or philosophical organizations are quite largely attended by listeners, or even members, from Oakland or San Francisco.

This is University Extension in all except that the students come to the classes instead of the classes going to them. Last year, regular Extension courses were begun in the two neighboring cities.

University men everywhere differ as to the advisability of this Extension work, whose great advocate in this country is the University of Pennsylvania. The English idea of taking to remote towns the opportunity for some real university work, which must be of a serious and systematic character, such as to rank up to a certain point with the work done in residence, is one thing, and the system of popular lectures toward which it easily degenerates among us is another. There is no question that the Extension lectures of the University have been successful, as lectures. Last year there was an average attendance of 40 at lectures on historical and comparative English grammar, 40 in mathematics, 100 in ethics, 250 in history (these in Los Angeles), and 400 in Shakespeare criticism. Of these 830 listeners, some 60 entered for examination, and 39 passed, and received certificates, which entitled them to a certain amount of credit for undergraduate work, should they ever become students at Berkeley. A limited amount of home study is expected of those regular attendants upon the lectures who propose to pass examination, and each lecture is supplemented with questioning, explanation, and discussion,— sometimes the examination and criticism of papers,— so that to the fraction who take the course as real students its educational value is unquestionable.

Whether these — about one tenth of the whole attendance in Oakland and San Francisco — might not have managed to hear the one lecture a week in Berkeley with as little trouble as it cost the lecturer to come to them may be questioned. As far as definite educational results are con-

cerned, it is rather a large apparatus for comparatively small results. But there are other justifications for the work. For one thing, the lectures and classes in cities within easy reach of the University are a test and a school for work in more distant ones. For another, they help to make the University known to the public.

This is a motive the University of California — perhaps because of its Yale ancestry — has always looked on with caution. It savors of advertising methods, and of the cheapening that befalls an institution of learning too anxious to be "known." To be trying to show itself to the best advantage and planning for public approval, is a dangerous step toward losing that solid and assured honesty that a university must have if anything on earth is to have it. Yet on the other hand, an American university, a private foundation scarcely less than a State one, depends upon the people; and while it must not court their favor by any betrayal of their interests in the way of lowering standards, neither has it a right to too close a seclusion. To distribute its regular official statements and hold its books open to inspection is not enough: in some way it must reach the people to give them knowledge of what it really is and is doing. How delicate and difficult a line of behavior a university must draw to do this effectively, and yet sacrifice nothing of a sturdy reliance upon the fact of its work rather than the appearance, one may realize by watching the behavior of the various American universities in this respect, — Yale, Columbia, Johns Hopkins, Harvard, Pennsylvania, Chicago, say. Extension lectures, publication of books and monographs, and popular presentation of results through the press, are the legitimate and usual methods, and there is not one of them that is not liable to a certain degeneration in the way of trying to make a good showing. The University of California has kept itself very free from this sort of degeneration. It has been conservative about issuing publications, in the absence of such important graduate work and research as might make these of unquestioned merit throughout the university world. It has been shy of the press, partly through unpleasant past experience. It carries this particular conservatism so far, indeed, as to amount to a neglect to take its real place in the eyes of the public. One finds in journals where regular reports are given from the colleges of the country no mention of the University of California, though institutions of perhaps one fifth the wealth and standing are heard from regularly. Books or magazines that publish popular articles on representative colleges of the country receive no reminder from this one that it belongs in the number. The bent and tradition of the University seems therefore a guarantee that the Extension work will not be managed in an advertising spirit, nor carried to an excess.

III.

In closing these articles upon the State University, which have lengthened beyond my wish or intention, I must first make a few corrections. Two are as to small points of fact, which I take the time to mention only in the interest of accuracy. Mr. Willey did not, as I said, leave New York in advance of the first steamer to Panama and join it at New Orleans, but sailed from New York on that steamer, which started, with its four young clergymen, before the news of the discovery of gold. Doctor Durant did not die at the Berkeley Club, where he was to have spoken of the "Good Time Coming," but was taken ill there, and died next day. A third error, which doubtless corrected itself to readers by its absurdity, was the careless copying down of the number of tons of rock — 72,000 — removed from

the crest of Mount Hamilton to get standing room for the Observatory, as 72!—a sort of error that fairly flaunts in a writer's face the temptation to say the printer did it. I may have committed other inaccuracies; but my attention has been called to no others.

I have been criticised, however, for the statement that the University is "weakest on the side of pure science," and not unjustly, for the phrasing is misleading. The sentence occurs in a rather hasty and cursory glance over the present status of the University, which closes an article intended to be primarily a story of origins; but it should none the less have been more carefully worded. It was far from my meaning to say that the *instruction* on this side is weak, or even less strong than in other directions. I have every reason to believe that some of the best work in the University is done in pure science. But the organization and equipment of the University are weak on this side. Certain subjects, indeed,—mathematics, physics, and chemistry in especial—have full place in the schedules, a staff of teachers in proportion to other departments, excellent laboratories, and adequate attention in every way; and this because they were regarded at the outset as supplying the theoretic basis on which several industrial sciences rest. Each of the three has in fact developed quite beyond this limited purport, and I was in error in saying that the College of Chemistry is given up to industrial chemistry: on the contrary, assaying, analysis of soils, and the like, are relegated to the Colleges of Mines and Agriculture, where they belong.

These sciences, with astronomy, make up what I may call an "exact science" group, and the others, geology, mineralogy, zoology, physiology, botany, may be grouped for want of a better term as "natural history" sciences. The University forces are thus divided:—

Technical Science.....	19 instructors,	35	courses
Exact Sciences.....	15 "	48	"
Language and Literature...	14 "	87	"
Sociology and Philosophy..	10 "	33	"
Natural History Sciences..	7 "	17	"

The largest force in a single branch is in Agriculture. In the Stanford University, out of a faculty somewhat smaller, the technical sciences have 12 men, the exact science group 10, and the natural history group 9; with a good deal more provision of laboratories and museums than in Berkeley. Harvard, out of a faculty not twice as large as that of Berkeley, has more than three times as many men in natural history; and the Chicago University announcements also make that group of sciences prominent. Michigan University, however, gives them less place than is given here; and I do not think that they have hitherto had much attention, on the whole, in systematized instruction in this country. The University of California is not so much behind other institutions in its provision for them, as behind its own in other departments. Two years ago, they had the services of but three men in the faculty. At present, their most serious disadvantage, which they share with all the sciences, except chemistry, outside of the technical courses is that the arrangement of courses tells somewhat against their election by students looking forward to a degree. As I have said, the system of "colleges" fixed in the State constitution is somewhat cumbrous. It protects the University against any dangerous alteration of its general plan by legislatures, but it also makes it hard to keep the expanding and increasing courses free and flexible. The regents have now under consideration the establishment of a new "college," which would not be bound by any constitutional regulation, and could with entire freedom provide for all courses not otherwise provided for. Even now, by a combination of choice of courses, and of elec-

tion within each course, the student has great freedom of choice in studies; and if the arrangement now talked of be carried out, he will have as perfect freedom as any but the most radical believers in electives could ask.

To summarize:—We have thus the University, built up of:—

I. The College of California, a pioneer classical college, created chiefly by New England men, largely under Yale influence, and now represented by the classical course of the College of Letters, and by a certain spirit of liberal learning throughout the institution.

II. The Colleges of Agriculture, Mechanic Arts, Mining, and Civil Engineering, making up a school of technology, established by Federal and State patronage, and expanded to a university by the adoption into itself of the classical college. These have carried out their original purpose unaltered.

III. The College of Chemistry, a scientific course added later by the legislature without the definite technical purpose; and the new courses, "Literary" and "Letters and Political Science," created by the regents nominally within the College of Letters. These represent really the growth and expansion of the University, the branching of the trunk growing from the two roots.

IV. The graduate and research work, now just beginning to rise to importance; and the several forms of outreaching work. These also are growths from the University's self.

V. The four professional schools, and the Lick Astronomical Department, acquired by gift and by affiliation, situated at some distance from Berkeley, and all except the Astronomical Department self-supporting.

There is thus sketched out an almost complete university system: when the School of Design is added, no important department of learning except theological study will remain unprovided for. It is conceivable that some time the way will clear for a non-sectarian provision for even this. As for the filling in of the outlines:—Within the colleges at Berkeley, the whole ground of practicable undergraduate study will be covered with a little more increase of force and adjustment of courses. If this were all, the increase of funds from the regular sources would be enough to keep the University in the front rank in America. But a university now depends more on its graduate than its undergraduate work for its status; and there is no such thing as having a sufficient revenue for graduate work, for this has all the known and the knowable as its province. Besides this insatiable demand, there is need of a special endowment for the Observatory, not less than half a million, and of endowments for all the professional schools, and especially the medical.

What will be the future of this university? It stands now fifth or sixth in wealth, seventh in numbers, of American universities. After his visit here last spring President Eliot, of Harvard, mentioned the University of California in a public address among "five leading American universities." Melvil Dewey, State Librarian of New York, at a learned gathering, said that there would be ultimately four great university centers in this country,—Harvard, ~~Johns Hopkins,~~ Chicago, and the University of California. When such things are said by careful men at a distance, people at home must believe that the prophecy may be fulfilled. Whether it will be, time must show. It will take many years to show whether the Pacific center of university life will finally be at Berkeley or Palo Alto. Some observers say that two really great universities cannot exist near together. The case of Oxford and Cambridge may be quoted to the contrary. In any case, the University of California has already set standards that can not be passed, except by a degree of attainment that will place the State very high in the world of learning.

Milicent W. Shinn.

A PENINSULAR CENTENNIAL. I.

Vancouver's Visit, in 1792, to the Bay and Peninsula of San Francisco.

Notable, every way, was the incoming, that winter dusk in 1792, of the first foreign ship known to have entered the Bay of San Francisco, bearing, in the person of its distinguished commander, the forerunner of the Teuton civilization and empire which was to have its seat on the waters of this "*mar mediteraneo.*"

Especially true is this to that historical student who touches his material not as debris, to be sorted and labeled, but as clay, and this not of the brickmaker but of the sculptor, interpreting a thought not his own.

The narrative runs easily.

On April 1, 1791, the young Lieutenant George Vancouver, then but thirty-three years old, set sail in his sloop-of-war, Discovery, for a voyage of exploration in the Pacific seas, which he had twice visited as a member of Captain Cook's party.

After visiting and surveying portions of Australia and New Zealand he set out for the north-west coast of America.

It was in April of 1792 that he sighted California, just south of Cape Mendocino. Two hundred and fourteen years had elapsed since his countryman Drake had visited these shores, taking possession of them in the name of his queen, Elizabeth, and giving to them the name of New Albion, which Vancouver is careful always to use. Proceeding northward the young explorer surveyed the coast with minute care to a point north of the island now bearing his name, and whose insularity he was, I believe, the first to prove. It was exactly two hundred years after the discovery of the island by Juan de Fuca.

Vancouver's work "formed the basis of all subsequent surveys." Some broad lines had remained to be drawn, others wholly re-drawn, and some amazing ones to be erased. Of these, notably, were the lines, drawn with some detail, of the mythical Straits of Anian, assumed to connect, on the latitude of the Great Lakes, the Atlantic and Pacific oceans, thus forming the water-way to Cathay which Columbus had sought just three hundred years before. Thus dissolved the dream, sublimest in its results of all illusions of men, of three centuries. (Winsor, however, states that it lingered in some minds so late as 1806.)

An international incident at Nootka Island gives color to Vancouver's subsequent visit to the Spanish settlement. At that place he met Señor Quadra, with whom he attempted a solution of certain problems concerning territorial and trading rights claimed by Spain. Their negotiations reached no conclusion other than a reference of the whole matter to a convention of their governments; but in this intercourse, that were so easily productive of animosities, was begun a generous friendship which was afterward so to advantage the one and embarrass the other.

And now on November 15, 1792, the Discovery rounded Point Reyes, and came into view of the broad sweep of coast line fronting the Farallon Islands, and long known as the Port of San Francisco.

In this open bay, or bight, several indentations were observable, one of which the young explorer knew to open into the newly found San Francisco Bay.

That this noblest of American harbors should have remained so long undiscovered — assuming that it is not

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